CLEMSON COLLEGE

RECORD
SEVENTIETH YEAR

CATALOG NUMBER
1962-1963

Preliminary Announcements 1963-1964

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**COLLEGE CALENDAR**

**SUMMER SESSIONS 1962**

*First Session*
- Matriculation, new students ............... June 11
- Matriculation and Registration .......... June 12
- Classes begin ................................ June 13
- Independence Day Holiday .................... July 4
- Examinations ................................. July 20, 21

*Second Session*
- Matriculation and Registration ............ July 23
- Classes begin .................................. July 24
- Examinations ................................... August 23, 24
- Faculty meeting to consider candidates for graduation August 25

**SESSION 1962-1963**
- Advanced Placement Examinations ........... September 6
- Matriculation, new students ................ September 7
- Registration, new students .................. September 11
- Matriculation and registration, current students September 11, 12
- Late registration fee applies .............. September 13
- Classes begin, abbreviated schedule ...... September 13
- Abbreviated class schedule ................. September 14
- Last day for matriculation .................. September 19
- Last day to add a subject .................... September 26
- Last day to drop a subject without record of drop October 10
- Last day to order diploma for mid-year graduation October 13
- Preliminary reports due ..................... October 29
- Thanksgiving Holidays ...................... November 22-24
- Clemson-Carolina Football Game .......... November 24
- Christmas Holidays begin at 1 p.m. ......... December 15
- Classes resume ................................ January 3
- Examinations begin ............................ January 17
- Faculty meeting to consider candidates for graduation January 25
- Mid-year graduation .......................... January 26
- Matriculation, new students ................ January 28
- Registration, new students .................. January 30
- Matriculation and registration, current students January 30, 31
- Late registration fee applies .............. February 1
- Classes begin, abbreviated schedule ....... February 1
- Abbreviated class schedule .................. February 2
- Last day of matriculation .................... February 7
- Last day to add a subject .................... February 14
- Last day to drop a subject without record of drop February 28
- Last day to order diploma for June graduation February 28
- Preliminary reports due ..................... March 19
- Easter Holidays begin at 1 p.m. ............ April 11
- Classes resume ................................ April 17
- Honors and Awards Day—classes suspended at 12 noon May 1
- Examinations begin ............................ May 22
- Faculty meeting to consider candidates for graduation May 31
- Commencement .................................. June 1
SUMMER SESSIONS 1963

First Session
(Classes meet Monday-Friday except as indicated)
Matriculation, new students ........................................ June 10
Matriculation and registration .................................... June 11
Classes begin .......................................................... June 12
Classes meet on Saturday .......................................... June 15
Examinations .............................................................. July 17, 18

Second Session
(Classes meet Monday-Saturday)
Matriculation and registration ..................................... July 22
Classes begin .............................................................. July 23
Examinations ............................................................. August 22
Faculty meeting to consider candidates for graduation ...... August 24
Graduation ............................................................... August 24

SESSION 1963-1964
Matriculation, new students ......................................... September 9
Registration, new students ......................................... September 11
Matriculation and registration, current students ............... September 11, 12
Late registration fee ................................................... September 13
Classes begin, abbreviated class schedule ....................... September 13
Abbreviated class schedule ......................................... September 14
Last day for matriculation .......................................... September 19
Last day to add a subject ........................................... September 26
Last day to drop a subject without record of drop ............. October 10
Last day to order diploma ............................................ October 12
Preliminary reports due .............................................. October 25
Clemson-Carolina game .............................................. November 23
Thanksgiving Holidays .............................................. November 28-30
Christmas Holidays begin at 1 p.m. ................................ December 18
Classes resume .......................................................... January 3
Examinations begin .................................................... January 16
Faculty meeting to consider candidates for graduation ...... January 24
Mid-year graduation .................................................... January 25
Matriculation, new students ......................................... January 27
Matriculation and registration, all students ..................... January 29, 30
Late registration fee applies ........................................ January 31
Classes begin, abbreviated schedule ............................. January 31
Abbreviated class schedule ......................................... February 1
Last day for matriculation .......................................... February 6
Last day to add a subject ........................................... February 13
Last day to drop a subject without record of drop ............. February 27
Last day to order diploma ............................................ February 27
Preliminary reports due .............................................. March 16
Easter Holidays begin at 1 p.m. ................................... March 26
Classes resume .......................................................... April 1
Honors and Awards Day—Classes suspended at 12 noon .... May 6
Examinations begin ..................................................... May 20
Faculty meeting to consider candidates for graduation ...... May 29
Commencement ............................................................ May 30
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PART I

PERSONNEL
PART I—Personnel

BOARD OF TRUSTEES

LIFE MEMBERS

R. M. Cooper, President of the Board.......................... Wisacky, Lee County
Edgar A. Brown .................................................... Barnwell, Barnwell County
James F. Byrnes .................................................... Columbia, Richland County
Charles E. Daniel ................................................... Greenville, Greenville County
Winchester Smith ................................................... Williston, Barnwell County
Robert R. Coker ..................................................... Hartsville, Darlington County
James C. Self ....................................................... Greenwood, Greenwood County

TERM EXPIRES 1964

Paul Quattlebaum, Jr. ........................................... Charleston, Charleston County
W. Gordon McCabe, Jr. ........................................... Greenville, Greenville County
T. Kenneth Cribb .................................................... Spartanburg, Spartanburg County

TERM EXPIRES 1966

A. M. Quattlebaum ................................................. Florence, Florence County
L. D. Holmes ....................................................... Johnston, Edgefield County
E. Oswald Lightsey ................................................. Hampton, Hampton County

G. E. Metz, Secretary .................................................. Clemson

BOARD OF VISITORS

1962

Kenneth Cribb ...................................................... Spartanburg
( Hold-Over Member)

Berkeley Grimball .................................................. Charleston
John M. Trask ......................................................... Beaufort
B. C. McLean ......................................................... Aiken
Marion W. Beacham .................................................. Barnwell
W. H. Clark ........................................................... Johnston
Robert L. Granger ................................................... Greenwood
John P. Faris .......................................................... Laurens
E. H. Rawl ............................................................. Spartanburg
William W. Foard ................................................... Cheraw
R. C. Harrington ..................................................... Winnsboro
Robert G. Clawson .................................................. Hartsville
J. W. Swink ........................................................... Effingham
EXECUTIVE OFFICERS

Robert Cook Edwards, B.S., LL.D. .................. President
Jack Kenny Williams, Ph.D. .................. Dean of the College
Walter Thompson Cox, B.S. .................. Dean of Student Affairs
Melford A. Wilson, B.S. in Commerce .................. Comptroller
Frank Johnstone Jervey, B.S., D.Sc. .................. Vice-President for Development

ADMINISTRATIVE OFFICERS AND STAFF

PRESIDENT'S OFFICE

Robert Cook Edwards, B.S., LL.D. .................. President
Gustave Ernest Metz, M.A. .................. Assistant to the President
Virginia Earle Shanklin, A.B. .................. Secretary to the President

ACADEMIC AND RESEARCH ADMINISTRATION

Jack Kenny Williams, Ph.D. .................. Dean of the College

SCHOOL OF AGRICULTURE *

William Henry Wiley, Ph.D. .................. Dean, School of Agriculture
Olen Branford Garrison, Ph.D. .................. Director of Agricultural Experiment Station;
Jess Willard Jones, Ph.D. .................. Director of Research in Agriculture
George Hubert Aull, Ph.D. .................. Head, Department of Agricultural
Lowery Heywood Davis, Ph.D. .................. Head, Department of Agricultural Education
Absalom West Snell, M.S. .................. Head, Department of Agricultural Engineering
Ulysses Simpson Jones, Ph.D. .................. Head, Department of Agronomy and Soils
Richard Ferman Wheeler, Ph.D. .................. Head, Department of Animal Husbandry
William Monroe Epffs, Ph.D. .................. Head, Department of Botany and Bacteriology
Willis Alonzo King, Ph.D. .................. Head, Department of Dairy Science
James Harvey Cochran, Ph.D. .................. Head, Department of Entomology and Zoology
Jack Harris Mitchell, Jr., Ph.D. .................. Head, Department of Food Technology and Human Nutrition
Koloman Lehotsky, Ph.D. .................. Head, Department of Forestry
Taze Leonard Senn, Ph.D. .................. Head, Department of Horticulture
Bobby Dale Barnett, Ph.D. .................. Head, Department of Poultry Science

SCHOOL OF ARCHITECTURE

Harlan Ewart McClure, M.Arch., F.A.I.A. .................. Dean, School of Architecture

SCHOOL OF ARTS AND SCIENCES

Howard Louis Hunter, Ph.D. .................. Dean, School of Arts and Sciences
Floyd Irving Brownley, Jr., Ph.D. .................. Head, Department of Chemistry and Geology
Headley Morris Cox, Ph.D. .................. Head, Department of English and Modern Languages
Dawson Clement Sheldon, Ph.D. .................. Head, Department of Mathematics

* See also School of Agriculture Staff, including Public Service Activities, on page 255.
** Agricultural Engineering curriculum is jointly administered by the School of Agriculture and the School of Engineering.
Academic and Research Administration

Lorenz Ditmar Huff, Ph.D. ...................... Head, Department of Physics
Carl Lafayette Epting, M.A. ................... Head, Department of Social Sciences
James Daniel Cotter, B.A., Lieutenant Colonel, United States Air Force—
                                        Head, Department of Air Science
Samuel Tilden McDowell, B.S., Colonel, United States Army—
                                        Head, Department of Military Science

SCHOOL OF ENGINEERING
Linvil Gene Rich, Ph.D. ....................... Dean, School of Engineering
Stanley Gosanko Nicholas, B.S. ............. Director of Engineering Research
Absalom West Snell, M.S. .................... Head, Department of Agricultural Engineering
Gilbert Chase Robinson, B.Cer.E. ............ Head, Department of Ceramic Engineering
Charles Edward Littlejohn, Ph.D. ............ Head, Department of Chemical and Metallurgical Engineering
Joseph Herbert Moore, Ph.D. ................ Head, Department of Civil Engineering
James Norton Thurston, Sc.D. ............... Head, Department of Electrical Engineering
Douglas Wilson Bradbury, M.S.E. .......... Head, Department of Engineering Graphics
Robert Wardlaw Moorman, Ph.D. ............. Head, Department of Engineering Mechanics
Everett Laitala, M.E. ......................... Head, Department of Industrial Engineering
James Clinton Cook, Jr., Ph.D. ............. Head, Department of Mechanical Engineering

SCHOOL OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE
Gaston Gage, M.Ed. ....................... Dean, School of Industrial Management and Textile Science
William Dabiney Trevillian, Ph.D. .......... Head, Department of Industrial Management
Joseph Lindsay, Jr., M.S. .................. Head, Department of Textile Chemistry and Dyeing
Thomas Alexander Campbell, Jr., M.Ed. .... Head, Department of Textile Management
Thomas Daniel Efland, M.S. ............... Head, Departments of Textile Research and Yarn Manufacturing
Arthur Ernest McKenna, M.S. ............... Head, Department of Weaving and Designing

GRADUATE SCHOOL
Hugh Holleman Macaulay, Jr., Ph.D. ........ Dean of the Graduate School

SUMMER SESSIONS
Claud Bethune Green, Ph.D. ................. Director of the Summer Sessions and Extended Programs

DIRECTOR OF THE LIBRARY
John Wallace Gordon Gourlay, A.M.L.S. .... Director of the Library

EDUCATIONAL COUNCIL

* Agricultural Engineering curriculum is jointly administered by the School of Agriculture and the School of Engineering.
TEACHING AND RESEARCH FACULTIES

ROBERT COOK EDWARDS
President
B.S., Clemson College; LL.D., The Citadel; LL.D., Wofford College

JACK KENNY WILLIAMS
Dean of the College, Professor of History
A.B., Emory and Henry College, 1940; M.A., 1947, Ph.D., 1953, Emory University

Abernathy, Atwell Ray, Assistant Professor of Civil Engineering.
A.B., Lenoir-Rhyne College, 1953; M.S.P.H., University of North Carolina, 1959;
Graduate Work, University of North Carolina, 1959-1962.

Ables, Joe Ralph, Assistant Animal Husbandman, Edisto Experiment Station.

Acorn, John Thomson, Assistant Professor of Architecture.

Adkins, Theodore Roosevelt, Jr., Associate Professor of Entomology and Zoology; Associate Entomologist.

Albert, Willard Benjamin, Associate Plant Physiologist.
B.S., 1923, M.S., 1924, Ph.D., 1926, University of Wisconsin.

Alexander, Paul Marion, Assistant Plant Pathologist.
B.S., California State Polytechnic College, 1953; M.S., 1955, Ph.D., 1958, Ohio State University.

Alley, Forrest Christopher, Assistant Professor of Chemical Engineering.

Amundson, Richard James, Assistant Professor of History.
B.A., Augustana College, 1959; M.A., Florida State University, 1960; Graduate Work,
Florida State University, 1960-1962.

Anderson, Grant William, Associate Professor of Zoology and Veterinary Medicine.
B.S., D.V.M., Iowa State College, 1932; M.S., Virginia Polytechnic Institute, 1934.

Arrington, Charles Anthony, Lecturer in Religion.
B.S., Clemson College, 1933; B.D., Southern Baptist Theological Seminary, 1938,

Arrington, Ottie Ward, Instructor in English.

Ashworth, Ralph Page, Associate Professor of Botany.
B.S., Wake Forest College, 1939; M.A., 1945, Ph.D., 1960, University of North Carolina.

Aull, George Hubert, Head of Agricultural Economics and Rural Sociology Department; Professor of Agricultural Economics and Rural Sociology; Agricutural Economist.
B.S., Clemson College, 1919; M.S., University of Virginia, 1928; Ph.D., University of Wisconsin, 1937.

Baff, Stanley, Instructor in Economics.
B.S., McNeese State College, 1959; M.B.A., Mississippi State University, 1960.

Balk, William Armstrong, Associate Agricultural Engineer, Edisto Experiment Station.
B.S., University of Georgia, 1948.

Ball, Walter Lee, Associate Professor of Electrical Engineering.

Banister, Robert Allen, Associate Professor of Engineering Graphics.
B.S., Clemson College, 1939; M.S., Bradley University, 1949.

Bardsley, Charles Edward, Jr., Associate Professor of Agronomy; Associate Agronomist.
B.S., University of Rhode Island, 1948; M.S., 1950, Ph.D., 1959, Mississippi State University.

[ 11 ]
Teaching and Research Faculties

BARDSELEY, VIRGINIA OWEN, Assistant Professor of History.
B.A., Mississippi State College for Women, 1925; M.A., University of Mississippi, 1931; Ph.D., Mississippi State University, 1961.

BARLAGE, WILLIAM BERDELL, JR., Assistant Professor of Chemical Engineering.
B.S., Lehigh University, 1954; M.Ch.E., University of Virginia, 1955; Ph.D., North Carolina State College, 1960.

BARNES, WILLIAM CARROLL, Superintendent, Truck Experiment Station; Horticulturist.
B.S., Clemson College, 1931; Ph.D., Cornell University, 1935.

BARNETT, BOBBY DALE, Head of Poultry Science Department; Professor of Poultry Science; Poultry Scientist.
B.S., 1956, M.S., 1954, University of Arkansas; Ph.D., University of Wisconsin, 1957.

BARTMESS, EUGENIE VENTRE, Instructor in Mathematics.
B.S., 1945, M.S., 1949, Louisiana State University.

BAUCHER, DEAN FORREST, Instructor in Economics.

BAUKNIGHT, LEHMANN M., JR., Associate Professor of Agricultural Economics.

BELL, MARSHALL CORNETT, Associate Professor of Mathematics.
A.B., 1933, M.A., 1936, University of North Carolina.

BENTLEY, ERNEST ELMO, JR., Lecturer in Military Science.
Captain, Artillery, United States Army; B.S., Mississippi State College, 1953; The Artillery School, 1953, 1960.

BICKLEY, DANIEL WHEELER, Assistant Agricultural Economist.
B.S., 1942, M.S., 1961, Clemson College.

BIERER, BERT W., Poultry Scientist.
V.M.D., University of Pennsylvania, 1934.

BISHOP, CARL BARNES, Assistant Professor of Chemistry.
B.S., Clemson College, 1934; Ph.D., Michigan State University, 1959; Post Doctorate, Yale University, 1959.

BISHOP, MURIEL BOYD, Assistant Professor of Chemistry.
B.A., Huntington College, 1952; M.S., Emory University, 1955; Ph.D., Michigan State University, 1958; Post Doctorate, Yale University, 1959.

BLACK, WATT LESLEY, Assistant Professor of Education.

BLOOM, A. WILLIAM, JR., Instructor in Speech and English.
A.B., Guilford College, 1960; M.A., University of Maryland, 1962.

BOLEN, CLAUDE WALDRON, Professor of History and Government.
A.B., Emory and Henry College, 1931; M.A., 1935, Ph.D., 1941, Duke University.

BOND, JOHN HOWARD, Associate Professor of Bacteriology.
B.S., 1948, M.S., 1949, Louisiana State University; Graduate Work, University of Texas, 1949-1952.

BOONE, MERRITT ANDERSON, Associate Poultry Scientist.
B.S., University of Nebraska, 1941; M.S., Michigan State University, 1947; Ph.D., University of Georgia, 1962.

BORGMAN, ROBERT FREDERIC, Associate Nutritionist.

BOWEN, WILLIAM CLAYTON, Associate Professor of Agricultural Education.
B.S., Clemson College, 1932; M.S., Colorado A & M College, 1940.

BOYD, VIRLYN ALEXANDER, Associate Professor of Rural Sociology.
B.S.A., Berry College, 1941; M.S.A., University of Kentucky, 1948.

BRADBURY, DOUGLAS WILSON, Head of Engineering Graphics Department; Professor of Machine Design.
B.M.E., Clemson College, 1940; M.S.E., University of Michigan, 1959.

BRANDT, GRAYDON WILLIAM, Associate Dairy Scientist.
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Browder, Lawrence Edward, M.S. ......... Chemistry
Bussey, Henry Shaw, B.S. ................... Horticulture
Byrd, James Cozby, Jr., M.A. .............. Physics
Caskey, Jerry Allan, B.S. .................... Chemical Engineering
Chen, Ting-Shu, B.S. .......................... Engineering Graphics
Collins, Gary Florence, B.S. ............... Mathematics
Conner, William Harris, Jr., B.S. ........ Chemical Engineering
Davis, Jack Hayne, B.S. ..................... Physics
Davis, Joe Bill, B.S. ........................ Chemistry
Deans, Stanley Roderick, B.S. ............. Mathematics
Dukas, George John, M.S. .................. Chemistry
Elliott, Raymon Paul, M.S. ................ Chemistry
Ellison, Thomas McKnight, M.S. .......... Chemistry
Gamble, Robert Oscar, B.S. ............... Mathematics
Ganter, Willard Wayne, B.S. .............. Engineering Mechanics
Garland, Michael McKee, B.S. .............. Physics
Grimes, Kenneth A., M/Sgt., U.S. Army ... Military Science
Hall, Edwin Platt, B.S. ..................... Chemistry
Ham, Charles Kent, B.S. ................... Electrical Engineering
Hane, John Keitt, III, B.S. ................ Chemical Engineering
Hasbrouck, Joseph Fraser, B.S. .......... Chemical Engineering
Henson, Joseph Lawrence, B.S. .......... Zoology
Hilley, Michael Eugene, B.S. ............. Engineering Mechanics
Honeycutt, Samuel Carroll, B.S. .......... Chemistry
Huffman, William Jay, M.S. ............... Chemical Engineering
Hunt, Oliver Larry, M.S. ................... Chemistry
Jenkins, Robert Patrick, B.S. ............. Civil Engineering
Johnson, Barbara Ferry, B.S. ............. English
Jordan, Kenneth Gary, M.S. ............... Chemistry
Keith, Lawrence Harold, B.S. ............ Chemistry
Koga, Joichi, M.S. ........................... Chemistry
Lacey, Christopher James, H.N.C. ....... Chemistry
Liberty, Vernon Earl, B.S. ................. Mathematics
Littrell, Robert Hardin, M.S. ............. Botany
Lloyd, Robert Austin, Jr., B.S. .......... Chemistry
McCarthy, States Marion, M.S. ........... Botany
McManus, Samuel Plyler, M.S. ............. Chemistry
McTeer, Paul Malcolm, B.S. ............... Mathematics
Marchini, Robert Riggs, B.S. .............. Physics
Marganian, Vahe Mardiros, B.S. .......... Chemistry
Marvin, James Charles, B.S. .............. Chemical Engineering
Meissner, Richard Frederick, B.S. ....... Engineering Graphics
Miler, George Gibbon, B.S. ............... Physics
Teaching and Research Faculties

Milligan, Carl William, M.S. .................................................. Chemistry
Moss, Marshall Elbert ......................................................... Civil Engineering
Parham, William Whitfield, B.S. ............................................ Chemistry
Powell, Harry Douglas, M.S. .................................................. Chemistry
Reid, William James, M.A. ..................................................... Physics
Reynolds, John Hughes, B.A. .................................................. Chemistry
Schumacher, Walter K., B.S. ................................................... Electrical Engineering
Smith, Calvin Delane, B.A. .................................................... Chemistry
Smith, William Alexander, B.S. ............................................. Mathematics
Stebbing, Emmett Britton, B.S. .............................................. Chemistry
Stewart, William Hogue, Jr., M.S. ......................................... Chemistry
Vaughan, Charles Gilbert, B.S. ............................................ Mathematics
Wagener, Earl Henry, B.S. ..................................................... Chemistry
Walkup, Joseph Beiling, Jr., B.S. ....................................... Engineering Graphics
Wiggins, Lemuel Edgar, III, A.B. ......................................... Mathematics
Wilkinson, Louis Alden, M.S. ................................................ Chemistry
Wilson, William Gibson, B.S. .............................................. Engineering Graphics
Wood, James Claude, Jr., B.S. ............................................. Physics
Youngblood, James Bennett, B.S. .......................................... Physics

STANDING COMMITTEES OF THE FACULTY, 1962-1963

Admissions:
K. N. Vickery, ex officio, Chairman; R. A. Banister, R. C. Harshman, J. C. Hubbard, C. M. Jones, C. M. McGee, R. W. Moorman, M. A. Owings, H. E. Vogel, R. J. Berry, ex officio.

Curriculum:
J. K. Williams, ex officio, Chairman; J. C. Cook, E. A. Gunnin, J. W. Jones, Joseph Lindsay, M. A. Owings, Victor Hurst, ex officio; K. N. Vickery, ex officio.

Ethics and Religion:

Faculty Basic Research:

Graduate Council:
HONORS AND AWARDS:

HONORS COUNCIL:

LECTURES:

LIBRARY:

SCHEDULE:

SOCIAL:

FACULTY SENATE
ADMINISTRATION OF STUDENT AFFAIRS

Walter Thompson Cox, B.S. .................... Dean of Student Affairs
George Edward Coakley, B.S. .................... Assistant Dean of Students
Virginia Smith Hardie, Ed.D. .................... Counseling Psychologist
Henry Edward Florey, Jr., M.A. .................... Resident Counselor
Jerry Lee Studdard, M.A. .................... Resident Counselor

OFFICE OF ADMISSIONS AND REGISTRATION
Kenneth Notley Vickery, B.S. .................... Director of Admissions and Registration
Reginald Justin Berry, B.S. .................... Registrar
William Richard Mattox, B.S. .................... Admissions Supervisor
Arnold Mandigo Bloss, B.S. .................... Student Financial Aid Supervisor
Gertrude Ramsay Bailey .................... Recorder

STUDENT CENTER AND Y. M. C. A.
John R. Roy Cooper, M.A. .................... General Secretary, Y. M. C. A.
Nash Newton Gray, B.S. .................... Assistant Secretary
Buford Earle Trent, M.Ed. .................... Assistant Secretary

Y. M. C. A. ADVISORY BOARD
B. D. Cloaninger, Chairman; J. A. Henry, Vice-Chairman; C. A. Arrington, G. H. Aull, W. T. Cox, T. A. Folger, C. B. Green, L. D. Holmes, W. A. King, Joseph Lindsay, H. H. Macaulay, L. D. Malphrus, H. J. Webb, M. A. Wilson, J. R. R. Cooper, ex officio; Gene Crocker, ex officio; R. C. Edwards, ex officio; N. N. Gray, ex officio; P. B. Holtzendorff, Jr., ex officio; B. E. Trent, ex officio.

CHAPLAINS
Charles A. Webster, Jr., B.D. .................... Director of Student Work, Baptist Church
Geneva Nell Metzger, M.R.E. .................... Associate Director of Student Work, Baptist Church
Thomas F. Tierney, C.S.P. .................... Pastor, Catholic Church
George P. LaBlanc, C.S.P. .................... Newman Club Chaplain, Catholic Church
Marshall Ohr James, M.S., S.T.B., B.A., M.A. Oxon. .................... Rector, Episcopal Church
George Milton Crum, Jr., B.D. .................... Chaplain, Episcopal Church
Enoch D. Stockman, B.D. .................... Pastor, Lutheran Church
William R. Kinnett, B.D. .................... Pastor, Methodist Church
Leonard Hobson Buff, Jr., B.D. .................... Director, Wesley Foundation, Methodist Church
Charles Edward Raynal, Jr., B.D. .................... Pastor, Presbyterian Church
Samuel Wylie Hogue, Jr., B.D. .................... University Pastor, Presbyterian Church

STUDENT PLACEMENT
Davis Gregory Hughes, M.Ed. .................... Director of Placement and Coordinator of Counseling
ATHLETIC STAFF

Frank James Howard, B.S. .... Director of Athletics and Head Coach
Robert Cole Bradley, B.S. .... Athletic Publicity Director
Fred Cone, B.S. .... Assistant Coach
H. C. Greenfield, M.S. .... Track Coach
Fred W. Hoover, B.S. .... Head Trainer
Robert Morgan Jones, B.S. .... Assistant Coach
R. P. Jordan, B.S. .... Assistant Football Coach
George A. Krajack, B.S. .... Assistant Basketball Coach
James Banks McFadden, B.S. .... Assistant Coach
H. C. McLellan, Jr., M.S. .... Assistant Business Manager
Covington McMillan, M.S. .... Assistant Coach
Christopher Columbus Roberts, Jr., A.B. .... Basketball Coach
Robert William Smith, B.S. .... Assistant Coach
James Donald Wade, B.S. .... Assistant Coach
Charles Fletcher Waller, A.B. .... Assistant Coach
Billy Hugh Wilhelm, A.B., Baseball Coach and Director of Intramural Sports
Eugene Perritt Willimon, B.S. .... Business Manager

ATHLETIC COUNCIL

R. R. Ritchie, Chairman; Gaston Gage, C. B. Green, R. W. Moorman, T. W. Morgan, J. L. Young, G. H. Hill, Budget Officer, ex officio; Victor Hurst, President, Faculty Senate, ex officio; K. N. Vickery, Director of Admissions and Registration, ex officio; Goode Bryan, Alumni Member; W. G. DesChamps, Alumni Member.

STUDENT HEALTH SERVICE

Judson Elam Hair, M.D. .... Director of Student Health Service
John Charles Barnett, M.D. .... Physician
Evelyn Littleton, R.L.T. .... X-ray and Laboratory Technician
Ruth Durham, R.N. .... Director of Nurses

DEPARTMENT OF BANDS

John Harrison Butler, M.F.A. .... Director
ADMINISTRATION OF BUSINESS AND FINANCIAL AFFAIRS

Melford A. Wilson, B.S. in Commerce ........................................... Comptroller
Kenney Rixie Helton .......................................................... Internal Auditor
Graham Hamilton Hill .......................................................... Budget Officer

ACCOUNTING DIVISION
Trescott Newton Hinton, B.A. .................................................. Chief Accountant
Melvin Eugene Barnette, B.S. .................................................. Accountant
Vivian Raymond Harrell ....................................................... IBM Supervisor
Joseph Shelor Walker, B.S. ..................................................... Bursar

PERSONNEL DIVISION
John Baker Gentry, Ed.M. ...................................................... Director of Personnel
Charles Wallace Lott .......................................................... Job Analyst

PHYSICAL PLANT DIVISION
Ralph Simpson Collins, B.E.E ................................................ Director of Physical Plant
James Cleveland Carey, B.S. .................................................. Superintendent of Grounds
Francis Furman Dean, B.S.M.E., Superintendent of Planning and Engineering
Roy Marcus Rochester, B.E.E ................................................ Plant Engineer
George Carlisle Jones, B.S. in E.E. ........................................ Superintendent of Utilities
Jack William Weeden .......................................................... Chief of Security

PURCHASING DIVISION
Earl Spencer Liberty, B.A. ...................................................... Director of Purchasing

AUXILIARY ENTERPRISES
Henry Hughes Hill, Jr., B.S. .................................................. Director of Auxiliary Enterprises
James Pearson Burns ........................................................... College Photographer
Luther J. Fields, B.S. .............................................................. Manager, Student Food Service
Sam Hanvey ............................................................. Supervisor, Central Office Services
Thomas Roy Rhymes .......................................................... Manager, Laundry
Henry Wordsworth Rimmer ................................................ Manager, Dormitory
Ernest Chisolm Watson, B.S. ................................................ Manager, Housing

THE CLEMSON HOUSE HOTEL
Frederick Leonard Zink, Jr. ................................................ Manager
Samuel Wickham Bissell, Jr. ................................................ Resident Manager

ADMINISTRATIVE COUNCIL

[ 36 ]
ADMINISTRATION OF DEVELOPMENT ACTIVITIES

Frank J. Jervey, B.S., D.Sc. ....................Vice-President for Development

PUBLIC AND ALUMNI RELATIONS

Joseph Edgar Sherman, B.S. ....................Director, Public and Alumni Relations
George M. Moore, B.S. ....................Assistant to the Director, Alumni Relations
Ray G. Davis, B.A. ....................College Editor
Fred C. Mohrmann, B.A. ....................Editor, College News Bureau
Charles B. Cooper, Jr. ....................Alumni Editor

DEVELOPMENT COUNCIL

R. C. Edwards, President; Frank J. Jervey, Vice-President for Development; J. K. Williams, W. T. Cox, M. A. Wilson, H. D. Nottingham, and G. E. Metz, Secretary.

CLEMSON ALUMNI ASSOCIATION

President-Elect ....................Harold B. Risner, '38 ....................Abbeville, S. C.
Vice-President ....................Nolan P. Shuler, Jr., '34 ....................Columbia, S. C.
Secretary ....................Joe Sherman, '34 ....................Clemson, S. C.
Treasurer ....................T. N. Hinton ....................Clemson, S. C.

National Council

<table>
<thead>
<tr>
<th>District</th>
<th>Term Expires</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1963—S. B. Earle, Jr., '30  Anderson, S. C.</td>
</tr>
<tr>
<td>2</td>
<td>1964—J. Fred Blackmon, '16  Greenville, S. C.</td>
</tr>
<tr>
<td>4</td>
<td>1963—Audrey H. Ward, '14  Aiken, S. C.</td>
</tr>
<tr>
<td>5</td>
<td>1964—J. B. Caughman, '26  Columbia, S. C.</td>
</tr>
<tr>
<td>6</td>
<td>1963—M. R. Lawton, '40  Estill, S. C.</td>
</tr>
<tr>
<td>7</td>
<td>1963—Alex C. Swails, '35  Kingstree, S. C.</td>
</tr>
<tr>
<td>10</td>
<td>1963—Dallas B. Sherman, '29  New York, N. Y.</td>
</tr>
<tr>
<td>14</td>
<td>1964—Jesse A. White, '24  Greensboro, N. C.</td>
</tr>
<tr>
<td>15</td>
<td>1963—W. Chester Cobb, '34  Providence, R. I.</td>
</tr>
</tbody>
</table>

At Large ....................1963—Frank M. Gunby, Sr., '02  Winchester, Mass. |
At Large ....................1963—E. O. Lightsey, '33  Hampton, S. C. |
At Large ....................1964—W. C. Snyder, '30  Midland, Texas |
At Large ....................1965—Henry Buchanan, '41  Anderson, S. C. |

Faculty Rep. — Victor Hurst  Clemson, S. C. |
Faculty Rep. — Robert Henningson  Clemson, S. C. |
Student Rep. — Leon J. Hendrix, '63  Clemson, S. C. |
Student Rep. — Joe D. Swann, '63  Clemson, S. C. |
Student Rep. — John B. Neely, '64  Clemson, S. C. |
Student Rep. — Thomas J. Bell, '65  Clemson, S. C. |
Student Rep. — Paul Jenkins, '66  Clemson, S. C. |
Pres., Foundation — T. C. Heyward, '08  Charlotte, N. C. |
Past President — Claude S. Lawson, '15  Birmingham, Ala. |
Past President — George G. Durst, '30  Sullivans Island, S. C. |
Past Vice-President— R. V. Magill, '30  Greenville, S. C. |

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PART II

INFORMATION
PART II—Information

GENERAL INFORMATION

Clemson is a land-grant, state-supported institution operating on the university pattern. Clemson is fully accredited by the Southern Association of Colleges and Schools.

The thirty-two undergraduate and thirty-five graduate curriculums under the Schools of Agriculture, Architecture, Arts and Sciences, Engineering, and Industrial Management and Textile Science form a background of training for the hundreds of occupations and professions in which Clemson graduates engage. The College is organized on a basis whereby it retains a clear entity through the inter-relationships of schools and departments providing a well-balanced fundamental and general educational program.

The enrollment of Clemson has grown from 446 students at the opening of the College in 1893 to 4,252 for the first semester, 1962-1963. Since the opening of the College, through the first semester 1962-1963, 43,246 students have attended Clemson and of this number 15,444 have been awarded the bachelor’s degree. During this same period, 532 masters’ degrees and 6 Doctor of Philosophy degrees were awarded.

ADMINISTRATIVE ORGANIZATION

The government of the College is vested in a Board of 13 members, including 6 elected by the Legislature and 7 life and self-perpetuating members, in accord with the Clemson will. The President of the College is the chief executive and administrative officer appointed by the Board of Trustees; and under the President there are four areas of administration, each headed by a chief administrative officer responsible to the President. The organizational units under each of these officers are outlined below:

I. Dean of the College
   A. School of Agriculture
   B. School of Architecture
   C. School of Arts and Sciences
   D. School of Engineering
   E. School of Industrial Management and Textile Science
   F. The Graduate School
   G. Extended Programs
H. The College Library
I. The Summer Sessions
J. The Computer Center

II. Dean of Student Affairs
A. Admissions, Registration and Financial Aid
B. Student Center and Y. M. C. A.
C. Student Counseling
D. Student Placement
E. Athletic Department
F. Student Health Service
G. College Bands

III. The Comptroller
A. Accounting Division
B. Personnel Division
C. Physical Plant Division
D. Purchasing Division
E. Auxiliary Enterprises
F. The Clemson House Hotel

IV. Vice-President for Development
A. Public and Alumni Relations
B. Planning
C. Sponsored Research
D. Fund Development

REQUIREMENTS FOR ADMISSION

To receive consideration for admission to Clemson, the applicant must, as a rule, present a transcript of his high school record giving evidence of graduation with a minimum of sixteen credits, and submit an official copy of his scores for the College Board tests used as an entrance examination. In reaching an admissions decision, the examination scores along with the student’s academic preparation, rank-in-class, and the recommendation of the high school principal will be weighed carefully.

In addition, students may qualify for entrance by:

(1) Achieving satisfactory scores on the College Board examinations and presenting a South Carolina High School Certificate (awarded by certificate examination).

(2) Achieving satisfactory scores on the College Board examinations and completing a minimum of 12 high school units. Students
in this category are required to make scores on the entrance examination which will place them in the upper one-fourth of the freshman class at Clemson.

(3) Achieving satisfactory scores on the College Board examinations and meeting the additional requirements for entrance with advanced standing.

As minimum additional criteria, the transfer applicant must present a statement of honorable dismissal from the institution last attended, an original transcript of his record from each college or university attended, and an official statement that he is eligible to return to the institution last attended. Candidates meeting these requirements will then be considered carefully in the light of the quality of their previous record, and work completed in other colleges with a grade at least one letter grade higher than the lowest passing mark will be evaluated in terms of equivalent courses in the curriculum at Clemson selected by the student.

Furthermore, in order for a transfer student to be considered for enrollment, his complete application, including test scores, transcripts and statement of eligibility, must be on file in the Admissions Office at least two weeks prior to the date of desired matriculation. Exception will be made only in the case of a student enrolled in another college who is applying for mid-year entrance. For admission in September 1963 these materials must be submitted not later than August 24.

Finally, various non-intellective factors will be considered in the case of both freshman and transfer applicants about whom it is impossible to make a positive decision on the strength of aptitude and previous academic performance alone.

Although not required, students planning to apply for entrance to Clemson are advised to include in their high school curriculums the following units:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>4</td>
</tr>
<tr>
<td>Geometry</td>
<td>1</td>
</tr>
<tr>
<td>Algebra</td>
<td>2</td>
</tr>
<tr>
<td>Physics</td>
<td>1</td>
</tr>
<tr>
<td>Chemistry</td>
<td>1</td>
</tr>
<tr>
<td>Trigonometry</td>
<td>½</td>
</tr>
</tbody>
</table>

It is appropriate for students planning to enroll in Agriculture and Pre-Medicine to include biology in their science program.

Effective in 1964, college algebra and trigonometry will no longer be included in the Clemson Engineering and Industrial Management curriculums. The first mathematics course applicable toward
an Engineering or Industrial Management degree after that date will be analytic geometry and calculus.

**Application Forms.** Forms to be used in applying for admission to the College may be obtained by writing the Office of Admissions and Registration, Clemson College, Clemson, South Carolina.

**Entrance Examinations.** All candidates for admission to Clemson College on the undergraduate level must complete the College Entrance Examination Board tests to include the Scholastic Aptitude Test given in the morning session and the achievement test in Intermediate Mathematics given in the afternoon session.

Applicants may secure a Bulletin of Information and an application for the tests from their local high school principals or guidance counselors. Should this literature not be available at the high school, the applicant should write to College Entrance Examination Board, P. O. Box 592, Princeton, New Jersey, (P. O. Box 27896, Los Angeles 27, California, for western residents) requesting a Bulletin of Information for administration of the Scholastic Aptitude Test and Achievement Tests.

All applicants are reminded to forward applications for the entrance examinations as indicated in the Bulletin of Information, and not to Clemson College.

The following points are important:

(1) Be sure to list Clemson as one of the schools to receive examination scores.

(2) Consideration will not be given to examination results by Clemson until an official application for entrance is on file in the Admissions Office.

(3) Up to five weeks is required for College Board to furnish examination scores, and tests should be scheduled early enough to allow ample time for scores to be received prior to planned entrance date.

As a part of the entrance examination, all candidates for admission to Clemson are required to take the achievement test in Intermediate Mathematics. The purpose in this is to determine which students are in need of a review course in mathematics before attempting college courses in this important subject. Those who have satisfactorily completed college courses in mathematics will not be required to take the review course. It is in the interest of the student that he is required to take such a review course if he does not make a qualifying score on the placement test. Such students may begin taking their other freshman subjects, but will postpone freshman
mathematics until after they complete satisfactorily the review course required.

Matriculation. Upon arrival for the opening of the session, new students report to the Office of Admissions and Registration to complete enrollment. A student's matriculation is equivalent to his pledge to conform to the rules of the institution. Any admission gained or matriculation made irregularly is subject to cancellation.

Students from Other Countries. A limited number of well-qualified students from other countries are accepted. The application for admission must be in English on the official application form furnished by the Office of Admissions and Registration. Official transcripts of all high school and college level work which the applicant has undertaken should accompany the application, plus a certificate from a competent medical authority attesting to the good health of the applicant.

In addition to academic and personal qualifications equivalent to those required of United States citizens, the applicant from another country is required to submit evidence of proficiency in oral and written English and of dollar-resources adequate without assistance from the College for at least the first year of his course of study, including round trip travel expenses. The College is unable to grant scholarship or fellowship assistance to students from abroad, and there is little likelihood that any type of employment may be secured.

If accepted, students from other countries should have a minimum of $600 in their possession upon reporting to the College. This amount is sufficient to make the entrance payment which includes tuition and fees for a semester, living expenses for one-half semester, and books and supplies. Foreign students will also be required to purchase student accident and sickness insurance.

The College reserves the right at any time to require foreign students to take a course or courses to remedy deficiencies in prior preparation for work at Clemson.

EDUCATIONAL BENEFITS FOR VETERANS

Public Law 550. Eligible veterans who have served in the active service in the Armed Forces for 90 days or more during the period June 27, 1950—January 31, 1955, and who have been discharged or released from active service under conditions other than dishonorable, may qualify for a program of education or training under Public Law 550, "Veterans’ Readjustment Assistance Act of 1952."
In general, each eligible veteran shall be entitled to education or training for a period equal to one and a half times the duration of his active service in the Armed Forces during the basic service period with a maximum period of entitlement of 36 months.

Information and forms for the filing of applications for assistance are provided by the Veterans' Administration.

Each eligible veteran enrolled in a program of education under this act will receive an allowance for the expenses of his subsistence, tuition, fees, supplies, books and equipment. For veterans enrolled on a full-time basis, allowances will be computed at the rate of $110 per month, if the veteran has no dependent, or at $135 with one dependent, or $160 with more than one dependent.

Veterans enrolled under Public Law 550 must carry a minimum of 14 semester credit hours to qualify for full benefits. Veterans enrolled for remedial mathematics must carry a minimum of 12 semester credit hours in addition to the remedial course in order to qualify for full benefits.

Public Law 894. For veterans qualified for benefits under Public Law 894, the Veterans' Administration pays tuition, fees and the cost of necessary books and supplies. The veteran pays his own living expenses, but the subsistence checks to be received by the veteran will more than reimburse him for the cost of living in the dormitories at Clemson.

SELECTIVE SERVICE REGULATIONS

Registration. For the benefit of students who become 18 years of age during the school year, provision has been made for such students to register for selective service in the Office of Admissions and Registration on the campus. The registration is then sent through channels to the registrant's local board.

Deferment. Students enrolled at Clemson who are subject to the provisions of the Selective Service Act may qualify for deferment to continue their education in several ways.

(1) Students enrolled in either Air Force or Army ROTC at Clemson College may be deferred from induction, after their first semester freshman year, until after graduation. Mere enrollment in the ROTC itself is no guarantee against induction. The cadet must further remain in good standing in both military and academic courses and continue to demonstrate his potential for becoming an effective officer.
(2) Any student who is called for induction during his school year is entitled to one statutory postponement to enable him to complete his school year. Thus, a student entering in September and called for induction during the year is deferred to enable him to complete the school year ending in June provided he had not previously received a postponement.

(3) Students may qualify for deferment to enable them to progress to the next class on the basis of their rank in the previous class. Thus, freshmen in the upper half of their class may be deferred for the sophomore year, sophomores in the upper two-thirds for the junior year and juniors in the upper three-fourths for the senior year.

(4) Students may qualify for deferments by attaining the required score on the Selective Service Qualification Test.

EXPENSES

Settlement of College Fees. Transactions relating to payments should be conducted with the Accounting Division of the Controller’s Office. Remittances may be made in cash, or by money order, cashier’s check, or personal check payable to Clemson College. All remittances made by mail should be addressed to the Accounting Division, Comptroller’s Office, Clemson College, Clemson, South Carolina. A personal check given in payment of expenses which is returned by the bank unpaid subjects the student to having his enrollment cancelled.

The College reserves the right to adjust charges to current costs. Tuition and fees for the full semester and living expenses for one-half of the semester are payable in advance at the beginning of each semester. (See section on Living Conditions and Costs for detailed information concerning advance payment of room rental.) Living expenses for the second half of the first semester will be due November 10 and for the second half of the second semester on April 1.

Refund of Academic Fees for Students Enrolled for Less than a Full Semester. Generally, no adjustments in charges will be made on a semester’s tuition and fees after five weeks from the date classes begin for the semester. Charges for periods of attendance of five weeks or less during a semester shall be made on the following basis:

<table>
<thead>
<tr>
<th>Duration</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two weeks or less</td>
<td>20%</td>
</tr>
<tr>
<td>More than 2 but not more than 3 weeks</td>
<td>40%</td>
</tr>
<tr>
<td>More than 3 but not more than 4 weeks</td>
<td>60%</td>
</tr>
</tbody>
</table>
More than 4 but not more than 5 weeks .................................. 80%
More than 5 weeks ........................................................................ 100%

Special provision has been made for a student who is required to discontinue his enrollment to report for active duty in the Armed Forces of the United States. Such students shall be charged for tuition, maintenance and activity fee, and medical fee on a daily pro rata basis, holidays excepted, instead of the percentage basis stated above; provided that such discontinuance of enrollment is the result of circumstances, conditions, or actions over which the student has no control.

Refund of Dining Hall and Dormitory Fees. Specific information relating to living expense refunds is given in the sections on dormitories and dining hall. However, no refund of any living expense items shall be due if the paid unused period in the quarter (one-half semester) is less than fifteen consecutive days. The Dean of Student Affairs shall approve all living status changes and there shall be no reduction of charges for late matriculation. The beginning date of any refund period shall be determined by the Dean of Student Affairs.

Schedule of Charges. The 1963-1964 charges for full-time students are shown below:

<table>
<thead>
<tr>
<th></th>
<th>South Carolina Student</th>
<th>Non-Resident Student</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>First Semester</td>
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</tr>
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<td>First Payment:</td>
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<tr>
<td>Tuition (Semester)</td>
<td>$75.00</td>
<td>$75.00</td>
</tr>
<tr>
<td>Matriculation Fee</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Non-Refundable)</td>
<td>5.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Maintenance and Activities Fee (Semester)</td>
<td>121.00</td>
<td>121.00</td>
</tr>
<tr>
<td>Medical Fee (Semester)</td>
<td>15.00</td>
<td>15.00</td>
</tr>
<tr>
<td>Library Fee (Semester)</td>
<td>12.00</td>
<td>12.00</td>
</tr>
<tr>
<td>Room Fee (½ Semester)</td>
<td>50.00</td>
<td>55.00</td>
</tr>
<tr>
<td>Board (½ Semester)</td>
<td>90.00</td>
<td>90.00</td>
</tr>
<tr>
<td><strong>Total Entrance Payment</strong></td>
<td><strong>$368.00</strong></td>
<td><strong>$373.00</strong></td>
</tr>
<tr>
<td>Second Payment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Room and Board</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Due November 10)</td>
<td>140.00</td>
<td>145.00</td>
</tr>
<tr>
<td><strong>Total First Semester</strong></td>
<td><strong>$508.00</strong></td>
<td><strong>$518.00</strong></td>
</tr>
</tbody>
</table>
Second Semester

Charges for the second semester are the same as the first semester. The payment for room and board for the last half of the second semester is due April 1.

Part-time Students. Undergraduate students taking less than 12 semester credit hours will be charged each semester according to the following schedule:

<table>
<thead>
<tr>
<th></th>
<th>S. C. Student</th>
<th>Non-Resident Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matriculation Fee</td>
<td>$5.00</td>
<td>$5.00</td>
</tr>
<tr>
<td>Tuition (per semester hour)</td>
<td>6.00</td>
<td>16.00</td>
</tr>
<tr>
<td>Maintenance and Activities Fee (per semester hour)</td>
<td>9.00</td>
<td>9.00</td>
</tr>
<tr>
<td>Library Fee (per semester hour)</td>
<td>.75</td>
<td>.75</td>
</tr>
</tbody>
</table>

Auditing. Charges for auditing are made each semester according to the schedule shown below:

<table>
<thead>
<tr>
<th></th>
<th>S. C. Student</th>
<th>Non-Resident Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition (per semester hour)</td>
<td>$3.00</td>
<td>$8.00</td>
</tr>
<tr>
<td>Maintenance and Activities Fee (per semester hour)</td>
<td>4.50</td>
<td>4.50</td>
</tr>
<tr>
<td>Library Fee (per semester hour)</td>
<td>.75</td>
<td>.75</td>
</tr>
</tbody>
</table>

Graduate Students. For further information concerning advanced degrees see The Graduate Bulletin, which may be obtained from the Offices of Admissions and Registration or the Dean of the Graduate School.

Definition of Residence for the Purpose of Determining the Payment of Tuition Fee. Out-of-state students pay a higher fee for tuition than South Carolina students. All students whose parents have not been domiciled in South Carolina for at least 12 months immediately preceding the day of their first enrollment in the institution shall be termed, for this purpose, to be out-of-state students, with the following exceptions:

(a) Students under 21 years of age who have resided in South Carolina for at least 24 months immediately preceding the day of their first enrollment.

(b) Students 21 years of age or over at the time of their first matriculation who have resided in South Carolina for at least 12 months immediately preceding the day of their first enrollment.

(c) Children of regularly employed Clemson College staff members.
The term "domiciled in South Carolina" means that the student is not in the State primarily to attend the institution and that his abode in South Carolina has not been set up merely as a technical bar to the higher tuition charge. Residence in the State by virtue of attendance in college or temporary military assignments may not be counted as satisfying the requirement for registration as a South Carolina resident.

Books and Supplies. The cost of books is not included in the figures given above. The cost of books and supplies at the beginning of the semester will be approximately $35. Students taking drawing must, in addition, purchase drawing instruments and equipment which cost approximately $45.

Late Registration Fee. To prevent or reduce the problems incident to late registration, registration schedules are set for specific days, and certain definite procedures are outlined. A student has not completed registration until all of the required steps are taken, the final one being the return of the properly signed Class Registration Card to the Office of Admissions and Registration. Any undergraduate student who fails to register for classes on the prescribed class registration days will be charged a late registration fee of $10. This late registration fee applies to full-time and part-time undergraduate students.

Student Banking Accounts. For the convenience of students, the College operates a banking department in the Bursar's Office where money can be deposited and withdrawn as the occasion may demand. This service is purely local. Students are urged to deposit their money in the bank and not to keep it in their rooms.

Optional Expenses. It is not possible to give an estimate of a student's expenditures for such amusements as dancing, motion pictures, etc. This depends largely upon the disposition of the student. The College endeavors to reduce to a minimum the temptation to spend money needlessly, but the authorities cannot be responsible for a student's private expenditures. This must be a matter between the student and his parents.

Transcripts. Official transcripts of scholastic records are issued on request. One transcript is furnished free; additional copies are issued for $1 each. Remittances for transcripts should be made payable to Clemson College, but should accompany transcript requests and should be mailed to the Office of Admissions and Registration.
LIVING CONDITIONS AND COSTS

Dormitories. Cost per semester, $100 for men and $110 for women.

Life in the student dormitories is under the direction of dormitory supervisors who are responsible to appropriate Deans in the Office of Student Affairs. Students are required to comply with published dormitory rules and regulations.

Residence hall accommodations are rented on a semester basis and rent on all dormitories is $100 per semester for men and $110 per semester for women. Before assignment to a room can be made, an advance payment for one-half of a semester’s rent must be made.

Students who are enrolled in the spring semester are given priority on room assignments for the fall semester provided a room request is filed and the payment of one-half a semester’s rent is made during the established priority period. Assignment after this date will be made on a first-come, first-served basis. New students and former students not currently enrolled will be sent necessary room application forms with the notification of acceptance.

Students who have made an advance payment and later decide not to enroll or to live in the dormitory may obtain a refund of the advance payment provided notification of intent and request for refund is received in the Dormitory Office prior to August 15 for the fall semester and prior to February 1 for the spring semester. When such notification and request is not received, no refund of the advance payment will be made. When students are assigned and occupy a room at the beginning of a semester, they are obligated for the half semester’s rent and no refund will be made.

If a student’s arrival on campus is to be delayed, the dormitory manager should be notified in order that the room assignment will not be cancelled. Failure to file such notice within the first five days of the semester shall give the College the right to cancel the room assignment.

The rooms for men are equipped with single-width beds, built-in clothes lockers, study table and two chairs. Bed linen, bed covers, pillows, towels, and laundry bags must be furnished by the students. Students are responsible for the cleanliness of their rooms.

Completion of Clemson’s first women’s dormitory is scheduled for September 1963.

The attractive four-story building will accommodate 144 students. The living areas located on the second, third and fourth floors are arranged into suites; 6 rooms or 12 students being assigned each.
Study rooms, baths and laundry rooms are conveniently located for each suite. The first floor consists of a large lounge, recreation room and apartment for a resident counselor.

The building will be carpeted throughout, each room having individual study desk, chest, closet and beds.

A passenger elevator will service all floors.

Radios and record players may be played so long as they do not disturb other dormitory residents. They must be played softly and may not be placed in or near a window or door while in operation.

No student shall have nor operate a television set in a dormitory room.

The College will not be liable for articles lost or stolen in the dormitories.

**Dining Hall.** Cost per semester $180.

The new College Dining Hall offers a counter-service cafeteria-type meal to students. Six large counters provide timely service of quality foods.

Students who live in the dormitories will be required to pay the Dining Hall fee. Students who live outside the dormitories may take all meals in the Dining Hall if they pay for such meals on the semester basis. Commuting students may eat the mid-day meal in the Dining Hall on a 5-day-week plan (Monday through Friday) by paying for the meal on the semester basis. The cost is $55 per semester.

Dining Hall services will not be provided during the Christmas Holidays.

Refund of paid unused services during the quarter (one-half semester) is made on a daily pro rata basis, holidays excepted, provided the unused portion is more than 14 consecutive complete days.

**Laundry-Dry Cleaning.** A new building with modern equipment is conveniently located on campus to service the laundry and dry cleaning requirements of the student. Reasonable prices are charged for individual items on a cash-and-carry basis.

The College will not be liable for lost or damaged items unless reported within two days after the delivery date, and then for not more than the actual depreciated value of such articles as have been lost or damaged.

For the convenience of those students who wish to pay in advance for laundry and dry cleaning, a $40 coupon book may be purchased at the Laundry. This amount should meet the student's laundry
and dry cleaning requirements for a semester. For the protection of purchasers, the coupons will be valid only when presented with the student’s identification card. Unused coupons may be redeemed only at the end of a regular semester, a summer session, or when a student is properly discharged from school.

Coin-operated washing machines and dryers are available in the laundry building and several of the dormitories.

**Married Student Housing.** Rentals: $27, $33, $36, and $42 per month.

There are three housing projects operated by the College for married students.

The East Campus Apartments consist of 100 two-bedroom apartments located in 50 buildings constructed of brick veneer on concrete block. These apartments are equipped with electric stove, refrigerator, gas fired circulating heater, and hot water heater. The rental is $42 per month.

The Littlejohn Apartments consist of 50 two-bedroom units contained in 11 brick veneer on concrete block buildings. The monthly rental is $33 for an interior unit and $36 per month for an end apartment. Oil burning circulating and hot water heaters are installed in these apartments. The rental includes cost of water.

The Prefabs consist of 247 two-bedroom houses and are equipped with oil burning circulating and hot water heaters. The monthly rental rate is $27 and includes water. Students assigned these units should be prepared to repaint the interior at their expense.

Applications for married student housing should be made to the College Housing Office which maintains waiting lists and assigns units on the basis of date of application.

**STUDENT HEALTH SERVICE**

The Director of Student Health is in charge of the student health service at Clemson College.

The chief function of the College Physician is to substitute for the family physician while the student is away from home. It is to this end that our efforts are directed. Certain limitations however are necessary and are set forth below.

During clinic hours, students who desire may consult the College Physician. In case of necessity, students are allowed to consult the College Physician at any time.
The College Physician will not notify parents each time a student reports to the infirmary, but in the event of serious illness or injury, parents will be notified as soon as possible.

The medical fee paid by each student covers the services of the attending physician and nursing care for ordinary sicknesses and minor injuries occurring on the campus. It does not cover the fees of outside doctors called in for consultation, special nurses or for medical or surgical attention performed away from the College. When a student, in the opinion of the attending College physician, needs outside diagnostic, surgical, or medical care, the student is responsible for the expenses of such care. Expenses for necessary ambulance service is the responsibility of the student.

Clemson College does not assume any responsibility for the care of injuries resulting from accidents that happen away from the campus.

STUDENT ACCIDENT AND SICKNESS INSURANCE

The Student Government of Clemson College, with the full approval of the Administration, offers a plan of accident and sickness insurance to Clemson Students. The purpose of this insurance is not to replace existing health facilities of the College, but rather supplement them by insuring the student against major expenses accompanying an unexpected accident or illness.

Each year, prior to the beginning of the fall semester, complete information on this insurance plan will be sent to parents of students.

Any information received by students or their parents concerning student insurance or any other program offered students will have the signature of the appropriate college administrator if it has official endorsement.

FINANCIAL AID FOR UNDERGRADUATES

General. The Office of Student Financial Aid is responsible for coordinating all types of financial assistance administered by the College, except honors and awards which are presented for special achievement and extracurricular grants-in-aid. The financial aids at Clemson consist of scholarships, student loans and part-time employment. Student wives interested in employment by Clemson College are encouraged to contact the Personnel Director.

Application Procedure. Starting in February eligible students currently attending Clemson may apply for any type of financial aid available for the coming school year. Only one application is
usually required to be considered for available scholarships, work and other specified forms of assistance. Prospective students may secure further information and application forms from the Supervisor of Student Financial Aid. Action on requests for financial aid will be based primarily on scholastic and activity record, eligibility to attend Clemson, financial need, and date application is received by the Student Financial Aid Office. Eligible applicants will be considered for other scholarships that become available during the school year.

SCHOLARSHIPS FOR ENTERING FRESHMEN

These awards will be based on high school records, entrance examination scores, and other conditions specified by the selection committees. A completed application, with a transcript of high school work through the first semester, must be mailed by March 1 in order to be considered for the coming school year. In addition, the College Board entrance examinations must be taken on either December 1, January 12, or March 2. Later dates are unacceptable for this purpose.

Dow Chemical Co. Scholarship. A $500 award is available for a freshman majoring in Chemical Engineering and may be renewed. Awarded by Department.

Leon Lowenstein Foundation Scholarships. Two $2,400 awards are available annually for male freshmen who enroll in the School of Textiles, to be paid in equal installments during four years of satisfactory undergraduate study. Selection will be limited to applicants whose families have an income of $10,000 or less. Awarded by School.

R. F. Poole Alumni Scholarship. To encourage academic excellence, scholarships will be given to incoming freshmen with outstanding academic potential and to upperclassmen who have demonstrated academic superiority. Awarded by College.

Sears, Roebuck Agricultural Scholarships. Seven $300 awards are available annually for freshmen from South Carolina who enroll in the School of Agriculture. An additional sophomore award is given the student making the highest scholastic average as a freshman Sears, Roebuck scholar. Awarded by School.

George E. and Leila Giles Singleton Scholarship. Income from a fund donated by Mr. G. H. Singleton ('19) provides a $300 award annually for a farm boy who enrolls in Agriculture. Residents of Oconee, Pickens, and Anderson counties are eligible, with prefer-
Scholarships for Upperclassmen

Scholarships

ence in that order. The award is for an entering freshman and may be renewed for an additional year. Awarded by School.

Smith-Douglass Agricultural Scholarships. A limited number of $750 awards are available for freshmen who enroll in the School of Agriculture, to be paid during four years of satisfactory undergraduate study. Applicants must be residents of one of the following South Carolina counties: Clarendon, Darlington, Dillon, Florence, Georgetown, Horry, Lee, Marion, Marlboro, Sumter, or Williamsburg. Awarded by School.

South Carolina Pest Control Association Scholarship. A $150 award is available annually for an Entomology major (entering freshman or upperclassman). Selection is based on scholarship, leadership, character and financial need. Awarded by Department.

South Carolina Poultry Improvement Association Scholarships. A $300 award is available annually for a freshman majoring in Poultry Science. An additional $300 award is available each year for a sophomore, junior, or senior. Awarded by Department.

South Carolina Textile Manufacturers Association Scholarship. One $2,000 award is available annually for a freshman who enrolls in the School of Textiles, to be paid in equal installments during four years of satisfactory undergraduate study. Awarded by School.

J. P. Stevens & Company Scholarship. A $2,000 award is available annually for a freshman who enrolls in the School of Textiles, to be paid in equal installments during four years of satisfactory undergraduate study. Awarded by School.

Western Electric Fund Scholarships. Two awards consisting of tuition, fees, books, and supplies are available annually for freshmen who enroll in Electrical, Industrial, or Mechanical Engineering and may be renewed if satisfactory progress is made. Awarded by School.

SCHOLARSHIPS FOR UPPERCLASSMEN

Recipients for the following awards are usually selected by Clemson College in the spring for the coming school year. Further information and application forms may be secured from the Supervisor of Student Financial Aid. Completed applications must specify scholarships desired and be returned to the Student Financial Aid Office in February for consideration by the appropriate committees.

Borden Agricultural Scholarship. A $300 award is given annually to the rising Agricultural senior having the highest cumulative grade-point ratio on all college work, who has earned a B grade...
or higher on at least a total of six credits in any junior and senior Dairy Science courses. Awarded by School.

**Burlington Industries Foundation Scholarship.** A $1,000 award is available annually to a rising junior with preference to students majoring in Textiles or closely related curriculums to be paid in equal installments during the last two years of satisfactory undergraduate study. Selection is based on leadership, scholarship, and financial need. Awarded by College.

**Callaway Scholarship.** A $500 award is made annually to a rising outstanding junior majoring in Textile Chemistry, Textile Management, or Textile Science. May be renewed. Awarded by School.

**Chemstrand Scholarship.** A $500 award is available to a rising senior majoring in Textiles, who is considered a superior, deserving student. Awarded by School.

**CIBA Scholarship.** A $1,000 award is available annually to a rising junior male student majoring in Textile Chemistry, to be paid in equal installments during the last two years of satisfactory undergraduate study. Selection is based on scholastic ability, financial need, personality, and leadership. Awarded by School.

**Coburg Dairy Scholarship.** A $1,000 award is available to a rising junior majoring in Dairy Science, to be paid in equal installments during the last two years of satisfactory undergraduate study. Selection is based on scholarship, leadership, character, and financial need. Awarded by Department.

**Ethyl Corporation Scholarship.** A $500 award is available annually for a student majoring in Chemical Engineering. Selection is based on scholastic ability and financial need. Awarded by Department.

**Ben and Kitty Gossett Scholarship.** Income from their contribution provides one or more awards for textile students whose families are employed by the textile industry in South Carolina. Awarded by School.

**Pauline Hanckel Dairy Scholarship.** A $1,000 award provided by the Ladies Auxiliary of the South Carolina Dairy Association is available to a rising junior majoring in Dairy Science, to be paid in equal installments during the last two years of satisfactory undergraduate study. Selection is based on scholarship, leadership, character and financial need. Awarded by Department.

**Higgins Undergraduate Scholarships.** Income from a fund donated by Mr. Higgins provides several awards for Engineering
undergraduate students. Selection is based on scholarship and need. Awarded by School.

Interchemical Foundation Scholarship. A $1,000 award is available annually to a rising junior in Chemical Engineering, Chemistry, Physics, or Textile Chemistry, to be paid in equal installments during the last two years of satisfactory undergraduate study. Selection is based on scholastic ability, personal traits, and financial need. Awarded by College.

David Jennings ('02) Memorial Scholarship. Income from a fund donated by members of his family provides one or more awards for deserving undergraduates, with preference for students majoring in Textiles. Awarded by School.

Keever Starch Scholarship. A $400 award is available annually to a worthy rising junior or senior majoring in Textiles. Awarded by School.

Sherwood E. Liles ('00) Engineering Scholarship. Income from a fund donated by his four sons provides an annual tuition award for a deserving engineering undergraduate. Awarded by School.

Owens-Corning Fiberglas Scholarships. Two $500 awards (one in Ceramics) are available annually to rising juniors or seniors majoring in Engineering or Textiles. Selection is based on scholarship ability, leadership qualities and financial need. Awarded by College.

Peace Fund Scholarship. A $500 award is available annually to a rising junior or senior. Selection is based on journalistic ability, scholastic achievement, and evidence of good character. Awarded by College.

Pennsylvania Glass Sand Scholarship. A tuition award is given annually to an outstanding rising senior majoring in Ceramic Engineering. Selection is based on scholastic achievement. Awarded by Department.

Ralston Purina Scholarship. A $500 award is given annually to a rising senior in the School of Agriculture. Selection is based on scholarship, leadership, character, extracurricular activities, sincerity of purpose in agriculture, and financial need. Awarded by School.

J. C. Rich ('13) Agricultural Scholarship. Income from a fund donated by his sister provides an annual award for a deserving male Agricultural undergraduate, with preference to a relative. Awarded by School.
Schlumberger Collegiate Award. A $500 scholarship is available annually to a rising junior or senior majoring in Physics, Electrical or Mechanical Engineering, who will take at least 12 credits in electrical engineering or electronics. Selection is based on academic standing and leadership ability. Awarded by College.

Seydel-Woolley & Company Scholarship. A $300 award is available annually to a rising junior or senior male student majoring in Textiles. Selection is based on scholastic ability, evidence of leadership potential to the southern textile industry, and financial need. Awarded by School.

Sonoco Products Scholarships. Two $500 awards are available annually for deserving undergraduates majoring in Textiles. Awarded by School.

South Carolina Dairy Association Scholarship. A $1,000 award is available to a rising junior from South Carolina majoring in Dairy Science, to be paid in equal installments during the last two years of satisfactory undergraduate study. Selection is based on scholarship, leadership, character, and financial need. Awarded by Department.

South Carolina Plant Food Education Society Scholarships. A $400 award is available each year to a rising junior majoring in Agronomy, to be paid in equal installments during the last two years of satisfactory undergraduate study. Selection is based on scholarship, financial need, character, and leadership. Awarded by Department.

U. S. Public Health Service Traineeships. Stipends of $3,000 per year are available to students majoring in Water Resources Engineering and to students majoring in Chemical Engineering with a minor and research interest in Water Resources Engineering. Inquiries concerning these traineeships should be directed to the Dean of Engineering.

United States Rubber Foundation Scholarship. A $750 award is available annually to a rising junior planning a career in industry, to be paid in equal installments during the last two years of satisfactory undergraduate study. Selection is based on proven scholastic ability and financial need. Awarded by College.
FINANCIAL AID FOR GRADUATE STUDY

Research and Teaching Assistantships are available to outstanding graduate students. Teaching assistantships are normally awarded for the academic year while research assistantships may be granted for periods of twelve months. Both are renewable. Stipends range from $1,800 to $4,000 and tuition is reduced. Application forms for assistantships are obtainable from the Dean of the Graduate School or from department heads. Recipients of assistantships are selected by the respective academic departments.

Graduate Fellowships and Grants-in-Aid are also available. Among them are the following:

Alumni Fellowships, ranging from $200 to $1,200, are awarded in all fields of study. These fellowships are made possible through gifts to the Alumni Loyalty Fund.

American Potash Institute Fellowship. A $2,500 award plus research materials to a student in Agronomy.

The Alexander P. and Lydia Anderson Fellowship. A $350 award for study in the biological sciences, including the applied and fundamental biological sciences, Agricultural Engineering, and Agricultural Economics.

Babcock and Wilcox Award. A $650 award to a student in Engineering.

Celanese Fellowship. A $1,500 award plus tuition, fees and research materials, to a student in Textile Chemistry.

Chemstrand Fellowships. Two awards of $2,000 to students in Chemical Engineering.

Clay Products Service Fellowship. A $1,500 award to a student in Ceramic Engineering.

Coker's Pedigreed Seed Company Award. A $2,400 award to a student in Agricultural Education.

Dow Corning Fellowship. A $1,500 award plus tuition, fees and research supplies, to a student in Textile Chemistry.

Eastman Kodak Fellowship. An award of $1,500 plus tuition and fees to a student in Chemical Engineering.

Foundation for Cotton Research and Education. A limited number of $2,500 awards, made to students in Agricultural Engineering, with concentration in Ginning Engineering. The recipients are selected by the Foundation (Box 9905, Memphis 12, Tenn.) with approval of the College.
Lead Industries Association Fellowship. A $2,400 award to a student in Ceramic Engineering.

E. C. McArthur Memorial Fellowship. A $2,500 award plus tuition and research materials given by the South Carolina Association of Soil Conservation District Supervisors to a student in Agricultural Engineering.

National Science Foundation Fellowships. The Graduate School is participating in the National Science Foundation Cooperative Fellowship program and also in the Foundation’s summer fellowship program for graduate teaching assistants. Inquiry about these fellowships should be made early in the academic year and should be directed to the Dean of the Graduate School.

Edward Orton, Jr., Fellowship. A $1,350 award plus supplies, to a student in Ceramic Engineering.

Southeastern Section of the American Water Works Association Fellowship. A $500 award to a student in the field of sanitary engineering.

Wade Stackhouse Loan Fund. Income from a fund donated by Dr. Wade Stackhouse in memory of his father is used to assist graduate students at Clemson and Clemson graduates who are accepted for graduate study.

Warwick Chemical Foundation Fellowships. Income from a fund, donated in memory of Manfred Caranci, available annually for awards to students in Chemistry.

Zonolite Fellowship. A $1,500 award to a student in Ceramic Engineering.

Grants-in-aid to graduate students are sponsored by the Mead Corporation and the Clemson Alumni through the Alumni Loyalty Fund.

All fellowship awards are made by the heads of departments concerned. Information about grants-in-aid is obtainable from the Dean of the Graduate School.

Other Funds. Limited assistance may also be available from the Clemson Foundation and Clemson Student Loan Funds. Communicate with the Student Financial Aid Office for further information.
LOAN FUNDS AVAILABLE AT CLEMSON

Recipients of the following aid are usually restricted by financial need, course of study, scholastic standing, and place of residence. In most cases, those students nearest graduation receive first consideration when these limited funds are available. Applications for other types of financial aid may also be considered for loans after communicating with the Student Financial Aid Office. Personal interviews are usually required prior to approval.

Georgianna Camp Foundation Fund. A considerable sum has been donated in memory of Georgianna Camp by her husband and sons to assist worthy students who are seeking a college education, but need help in addition to their own efforts and available sources of income.

Clemson Architectural Foundation. Needy architectural students in the upper years of their curriculum who show professional promise will be considered for loans from the General Fund of the Foundation.

Clemson College Foundation. A limited sum from the General Fund is available for emergency student loans. Included are donations from family and friends in memory of J. C. Littlejohn ('08), J. H. Woodward, Jr., ('35) and his father, “Uncle Jake” ('02).

Clemson Student Loans. A number of interested staff, faculty, alumni, families, and friends have made memorial donations to assist worthy students. Included are the following funds: Anderson Kiwanis, for juniors and seniors from Anderson County; George Cherry, for upperclassmen from Oconee County and Pendleton area; William Wilson Finley, for students living in counties traversed by the Southern or Blue Ridge Railways; Forestry Department, for deserving upperclassmen; Henry B. Harper, preferably Agriculture or Management students; Richard Hughes Johnson, prefer family approval; R. F. Poole ('16), by his classmates; S. R. Rhodes, for deserving white junior or senior Electrical Engineering students; and Henry Thomas Stroud, for worthy upperclassmen.

Daniel Memorial Loan Fund. Income from a sum donated by officers of the corporation in memory of James Flemming Daniel and Fred Adams Daniel may be lent to deserving students.

David Jennings Loan Fund. Income from a sum donated by David Jennings ('02) in memory of his parents and brother is used to aid worthy and deserving students, with preference given to students majoring in Textiles.
National Defense Student Loan Program. State and Federal funds are available for needy, full-time students in good academic standing. Applications for such loans must be submitted at least eight weeks in advance of the session for which required.

Reid-Baskin Fund. Income from an invested sum, and future donations in memory of Cecil L. Reid ('02) and John Bryce Baskin, will be used to aid deserving white students with preference for Newberry and York County residents.

Tile Council of America Fund. The Tile Council has made a grant to be used for interest free loans to outstanding and needy students in the lower years in the Architectural curriculum.

STUDENT PART-TIME EMPLOYMENT

Clemson College employs students for those positions wherein such part-time services can be utilized to an employment advantage. Clemson students in actual need of financial aid are usually given preference in filling positions, all other qualifications being equal. The Student Financial Aid Office maintains application files on students desiring and needing part-time employment for the information of requesting departments and off-campus agencies interested in securing such help. Applications must be filed after registration each semester if part-time work is desired.

OTHER SOURCES OF FINANCIAL AID

The following types of assistance are not administered by Clemson College. When payment is to be made through the College, recipients should furnish supporting agencies with a schedule of payments due the Bursar. Such funds must be received by the Bursar on or before the due dates, or he should be notified in advance if other arrangements are to be considered.

National and State Agencies. Students should investigate such sources of financial aid as the following: Veterans Education, War Orphans Education, various cadet ROTC programs, income tax exemption, National Guard and Reserve Training programs, National Merit Scholarships, American Legion free tuition for deceased or totally disabled veterans' children, and grants for the handicapped through the State Department of Vocational Rehabilitation.

Other Agencies. Often help is received from grants or loans through Beta, FFA, and 4-H Club membership; local organizations of the Daughters of American Revolution, United Daughters of Confederacy, Civitan, Elks, Masons, Rotary, and similar groups; James
F. Byrnes Foundation, Columbia, S. C.; The Garden Club of South Carolina; Pickett and Hatcher Educational Fund, Columbus, Ga.; Methodist Student Loan Foundation, Nashville, Tenn.; Knights Templar Educational Foundation, Columbus, S. C.; United Student Aid Funds; Texize Chemicals, Greenville, S. C.; South Carolina Plant Food Educational Society, Charleston, S. C.; South Carolina Vocational Agriculture Teachers Association; and other religious, civic, welfare, or educational agencies.

**Industry and Related Foundation Support.** Students are often able to finance part of their education by summer employment or in some cases by alternate semesters at college and on jobs with establishments near their homes. Under certain conditions students may be eligible for loans or grants which are administered by corporate and local companies for the children of employees desiring a college education.

**HONORS AND AWARDS**

Recipients for the following awards are chosen for their special achievements by selection committees, and are announced at an annual Honors and Awards Day program in the spring or at other appropriate ceremonies during the year.

**Air Force Association Medal.** The Air Force Association of Washington, D. C., awards this medal annually to the outstanding senior AS IV cadet who has completed AFROTC summer camp and who has shown outstanding aptitude for both academic and military pursuits.

**The Alpha Rho Chi Medal.** The Alpha Rho Chi fraternity annually awards a gold medal to the graduate of the professional curriculum in Architecture who has shown the greatest leadership, service to his school, and who gives promise of professional merit.

**Alpha Tau Alpha Scholarship Medal.** An annual award is given to the senior in Agricultural Education having the highest scholastic record.

**Alpha Zeta Award.** An annual award is given to an agriculture major having a high scholastic record and possessing qualities of character and leadership.

**American Association of Textile Chemists and Colorists Award.** An annual award is given for the best work done in Textile Chemistry and Dyeing by a member of the graduating class.

**American Association of Textile Technologists Award.** An annual award is given to the graduate having the highest scholarship and all-round qualification for success in the textile industry.
American Association of University Women Award. The Clemson branch awards an engraved silver bowl annually to the girl graduating with the highest cumulative grade-point ratio.

American Chemical Society Award. An annual award is given to the outstanding senior in Chemistry who is a member of the student affiliate chapter of the American Chemical Society.

South Carolina Chapter, American Institute of Architects Award. The South Carolina Chapter of the American Institute of Architects each year awards a Certificate of Merit to the outstanding fourth-year student of Architecture in the Design Option and the Structural Option.

American Institute of Architects Medal. The National Organization of The American Institute of Architects awards each year a silver medal and a book to the outstanding graduate in the professional curriculum in Architecture at Clemson. An award is also presented to the runner-up.

American Institute of Chemical Engineers Award. The American Institute of Chemical Engineers sponsors an annual award to the junior majoring in Chemical Engineering who has attained the highest scholastic standing through the sophomore year.

American Institute of Electrical Engineers—Institute of Radio Engineers Scholastic Award. An annual award is given to the second semester junior or the first semester senior in Electrical Engineering having the highest scholastic record. Recipient must be a member of the AIEE-IRE Branch.

American Society of Agronomy Award. The American Society of Agronomy sponsors an annual award to an outstanding senior in Agronomy.

American Society of Civil Engineers Membership Award. The South Carolina Section of the American Society of Civil Engineers sponsors an annual award to the outstanding graduating senior in Civil Engineering.

The American Society of Mechanical Engineers Award. An annual award is given to a senior in Mechanical Engineering for his outstanding service in the School of Engineering.

Society of American Military Engineers Award. The Society of Military Engineers of Washington, D. C., sponsors an annual award to the most outstanding AFROTC cadet junior majoring in Engineering.

Society of American Military Engineers Award. The Society of American Military Engineers awards annually a gold medal with
key replica to the twenty outstanding Army ROTC cadet juniors and to the twenty outstanding Army ROTC cadet seniors enrolled in the Army General Military Science ROTC Units in colleges and universities throughout the nation who are majoring in Engineering.

Architects' Certificates of Merit. The South Carolina Chapter of the American Institute of Architects each year awards a certificate of merit to the outstanding fourth-year student in the design option and structural option of the professional curriculum in Architecture.

The Architectural Faculty Award. The School faculty annually makes an award to the first-year student in Architecture displaying outstanding promise.

Armed Forces Communication and Electronics Association Gold Medal. The Armed Forces Communications and Electronics Association of Washington, D. C., sponsors an annual award to the outstanding senior Army ROTC cadet majoring in Electrical Engineering.

The Armed Forces Communication and Electronics Association Gold Medal Honor Award. An annual award is given to the outstanding AFROTC senior majoring in Electrical Engineering who has demonstrated outstanding qualities of military leadership, character, and definite aptitude for military service.

Association of the United States Army ROTC Award. The Association of the United States Army, Washington, D. C., annually awards a medal to the junior ROTC cadet who is in the top 10 per cent in ROTC grades and in the top 25 per cent in general academic grades and who has contributed most, through leadership, to advancing the standing of the Army ROTC unit and the Military Science Department at Clemson College.

Best Drilled AFROTC Cadet. Awarded annually to the AFROTC cadet demonstrating the greatest efficiency in drill procedures. Award is adjudged near the end of each academic year with competition open to all AFROTC cadets.

Best Drilled AFROTC Cadets. Awarded annually to the AFROTC cadets in the junior, sophomore, and freshman classes, adjudged as the best drilled cadet within their respective class.

Best Squadron Commander Award. Awarded annually to the commander of the squadron adjudged as the best drilled squadron of the AFROTC Cadet Wing. Each member of this squadron is then awarded the ribbon, Member of the Best Drilled Squadron.

Block and Bridle Club Scholarship. A $50 award to be paid at the beginning of each regular semester is available to a junior in
the Block and Bridle Club. Selection is based on scholastic ability, financial need and leadership in the club and other activities.

Arnold R. Boyd English Honor Key. Arnold R. Boyd, Class of 1914, donates this Honor Key annually to a student in the graduating class who makes an outstanding record in English during his college course.

Chemical Rubber Company Achievement Award in Chemistry. An annual award is given by the Chemical Rubber Company to the student majoring in Chemistry, Textile Chemistry, or Chemical Engineering who made the highest grade in the first semester course in Chemistry.

The Chemical Rubber Company Achievement Award in Physics. An annual award given by the Chemical Rubber Company to the student making the highest grade in sophomore physics.

Chemistry Faculty Award. An annual award is given to the sophomore majoring in Chemistry who maintained the highest scholastic record in Chemistry during his first two semesters of work.

Chicago Tribune Gold Medal Awards. These awards are given annually to the two senior AFROTC cadets who are most outstanding in military training, academic achievement, and motivation for flying training.

Chicago Tribune Gold Medal Awards. Awarded annually by the Chicago Tribune to the outstanding Army ROTC senior and junior. The awards are based on military achievement, scholastic attainment, and character.

Chicago Tribune Silver Medal Awards. These awards are given annually to the two junior AFROTC cadets who are most outstanding in military training, academic achievement and motivation for flying training.

Chicago Tribune Silver Medal Awards. Awarded annually by the Chicago Tribune to the outstanding Army ROTC sophomore and freshman. The awards are based on military achievement, scholastic attainment, and character.

Class of 1902 Awards. The members of the Class of 1902 have deposited with the Clemson College Foundation three funds of $2,000 each, in recognition of the distinguished teaching services of three professors who were on the faculty at that time, and in memory of those of the class who have passed on. The income from these funds is to be awarded annually as follows: The Williston Wightman Klugh Award, to a worthy, earnest undergraduate student of good moral code and personality who intends to make
teaching his life work; The Rudolph Edward Lee Award, to a worthy undergraduate student in Architecture, upon the recommendation of the faculty of that School after consideration of the student’s grades, extracurricular activities, and those qualities that go toward making a successful professional architect and The Samuel Maner Martin Award, to a worthy undergraduate student taking mathematics as a major subject.

Commander's Saber. Presented annually by the Professor of Military Science to the Army ROTC cadet officer considered to have contributed most to the advancement of the cadet brigade through leadership and devotion to duty.

Howard Carlisle Copeland Memorial Award. The family of Howard Carlisle Copeland, who gave his life during World War II, has set up a permanent memorial fund in his memory. Each year the interest from the fund shall be given to the boy who has made the greatest endeavor financially to stay in college.

Danforth Fellowships. The Danforth Foundation of St. Louis awards two fellowships each year to agricultural students. One of these is given to an outstanding member of the junior class majoring in either Agricultural Economics, Agricultural Education, Animal Husbandry, Dairy Science or Poultry Science, and provides for a 2-week summer short course with Ralston Purina Company, and a 2-week stay at the American Youth Foundation Leadership Training Camp at Shelby, Michigan. The second award provides for a 2-week stay at the Leadership Camp at Shelby, Michigan, and is awarded to an outstanding freshman in the School of Agriculture.

Distinguished AFROTC Cadet Badge. An annual award is given by the Department of the Air Force to those individuals, designated by the Professor of Air Science, who possess outstanding qualities of leadership, high moral character, and definite aptitude for Air Force service. They must have attained an academic standing in the upper 25 per cent of their class and demonstrated leadership ability through their achievements while participating in recognized campus activities. Such recognition carries with it the opportunity for commissioning in the Regular Air Force.

Distinguished Military Student Badge. An annual award is given by the Department of the Army to those individuals, designated by the Professor of Military Science, who possess outstanding qualities of leadership, high moral character, and definite aptitude for Army service. They must have attained an academic standing in the upper half of their class and demonstrated leadership ability through their
achievements while participating in recognized campus activities. Such recognition carries with it the opportunity for commissioning in the Regular Army.

Samuel B. Earle Award. An award established by Clemson Alumni in honor of Dean Samuel B. Earle, who ended 48 years of service to Clemson College in July, 1950, is given annually to an outstanding senior in the School of Engineering.

Faculty Scholarship Award. An annual award is given to the member of the graduating class with the highest academic achievement by the academic faculty. This award consists of a certificate and a gold medal.

Forestry Award. The income from a fund donated to the College is presented annually to the senior in Forestry with the highest academic record.

Ben H. Gardener Award. The income from a fund donated to the College by the father and son is given annually to some worthy and needy student in the School of Engineering.

General Dynamics Award. An annual award is given to the most outstanding sophomore student of the basic AFROTC course who is qualified and motivated for flying training.

Industrial Management Faculty Award. An award is given annually to the member of the graduating class majoring in Industrial Management who has attained the highest academic standing.

Industrial Management Merit Award. An award is provided by the Neely and Gibson Coal Sales Company (William J. Neely, '32, and Harry H. Gibson, '32) for an Industrial Management major who has demonstrated through outstanding academic performance and excellent personal characteristics sufficient potential to enable him to assume significant managerial responsibilities in modern industry.

James Lynah Merit Awards. Income for several awards is derived from a fund established by Mr. James Lynah, in memory of distinguished professors who were teaching at Clemson when the Class of 1902 were undergraduates, as follows: The Charles Manning Furman Prize in English, The Mark Bernard Hardin Prize in Chemistry, The William Shannon Morrison Prize in History, The Charles Carter Newman Prize in Horticulture, The Walter Merritt Riggs Prize in Electrical Engineering and The Augustus G. Shanklin Prize in ROTC, Air or Military Science and Tactics. These awards are made to students having a high scholastic rating and possessing outstanding qualities of character and leadership.
Clark Lindsay McCaslan Award. A sum of money has been deposited with the College to establish a fund in memory of Clark Lindsay McCaslan, Class of 1908, and a pioneer in Agricultural Engineering. The income from the fund shall be given annually to the student in the Department of Agricultural Engineering who, in the opinion of the faculty shall be deemed to be the most deserving.

Marksmanship Award. Awarded annually to the AFROTC cadet achieving the highest scores among the AFROTC cadets of the College Rifle Team.

Marksmanship Awards. Medals are annually presented to those members of the Army ROTC Rifle Team achieving highest position average scores.

Dr. Ralph Mershon Memorial Award. The Secretary of the Army will present annually a $250 prize to the outstanding Distinguished Military Graduate of a senior division Army ROTC university or college who is commissioned in the Regular Army.

The Minaret Award. The Minaret Society each year presents a Certificate to the outstanding second year student in the professional curriculum in Architecture. Scholarship, leadership and qualities of character will be considered.

Northern Textile Association Medal. For several years, medals have been awarded to the outstanding graduates annually in Textile Engineering, both in February and in June.

National Defense Transportation Association Award. The National Defense Transportation Association will award annually the NDTA Medal to the twenty outstanding senior students enrolled in General Military Science Army ROTC units throughout the nation.

Neatest Appearing AFROTC Cadet. Awarded annually to the neatest appearing cadet of the AFROTC Cadet Wing.

Thomas Newcomen Award in Material History. The Newcomen Society in North America gives an annual award for the best research paper presented in the field of Material History.

Norris Medal. The following is from the will of the Hon. D. K. Norris, a life trustee of Clemson, who died in 1905:

"I give $500.00 face value, Norris Cotton Mill stock... on condition the dividend thereon shall be applied annually to the purchase of a gold medal, to be known as the 'Norris Medal', to be awarded to the student of Clemson meriting the same at graduation, under such rules and conditions as may be prescribed by the said..."
Board of Trustees, and which medal shall have engraved on it 'Honor habet onus' (Honor brings responsibility).

American Ordnance Association Gold Scholarship Key. The American Ordnance Association, Washington, D. C., sponsors annually an award to the senior Army ROTC cadet with the most ability in the ordnance field to be commissioned to the Ordnance Corps.

Willie N. and Joe Wise Paget Scholarship. The income from a fund donated to the College by members of their family is used annually to aid a deserving student from Saluda County.

Phi Eta Sigma Mathematics Award. An annual award is given to a freshman scoring highest on a competitive examination in mathematics.

Phi Eta Sigma Scholarship Medal. An annual award is given to the senior having the highest scholastic record.

Phi Kappa Phi Award. An annual award is given to the junior having the highest scholastic record.

Phi Psi Award. This award is made annually by the National Honor Council of the Phi Psi Textile Fraternity to the textile graduate who has attained the highest scholastic record in textile courses.

Quartermaster Association Awards. The Quartermaster Association annually awards a medal to the ten outstanding junior students and a scholastic key to the ten outstanding senior students enrolled in the Army General Military Science ROTC program in colleges and universities throughout the nation. Students must be enrolled in courses including as a major item of curriculum at least one educational area of particular interest to the Quartermaster Corps.

Reserve Officers Association Award. Awarded annually to an AFROTC junior and senior cadet, based on scholastic and Air Science grades, and leadership qualities.

Reserve Officers Association Medal. The South Carolina Department of the Reserve Officers Association sponsors an annual award to the outstanding senior Army ROTC Cadet.

Sigma Pi Sigma Prize. An annual award is given to the outstanding senior in the Physics Department.

Sigma Tau Epsilon Membership Award. An annual award is given to the sophomore majoring in the School of Arts and Sciences and having the highest scholastic record.

R. W. Simpson Medal. A medal designated as the "R. W. Simpson Medal" is awarded annually to the best drilled cadet in the freshman, sophomore, or junior class.
The Solite Award. The Southern Lightweight Aggregate Company annually makes a grant of $1,000 to the Clemson Architectural Foundation, a portion of which is used for prizes for those fifth-year professional theses adjudged to be outstanding.

Sons of the American Revolution Award. An annual award is given to a freshman AFROTC cadet who is outstanding in academic courses, Air Science courses, and leadership characteristics.

The South Carolina Masonry Association Award. The South Carolina Masonry Association annually makes a grant of $600 to the Clemson Architectural Foundation, a portion of which is used for awards in an intermediate-level architectural design problem.

South Carolina Society of Sons of American Revolution Medal. An annual award is given to an Army ROTC cadet who exhibits a high degree of merit with respect to leadership, soldierly bearing and excellence in theoretical courses of study.

The Southern Brick and Tile Award. The Southern Brick and Tile Association annually makes a grant of $100 for prizes awarded in an advanced-level architectural design problem.

Algernon Sydney Sullivan Medallion. A valuable and artistic memorial, established by the Southern Society of New York in honor of its first president, is awarded each year by the College to a member of the graduating class and to one other person who has some interest in, association with, or relation to the institution, official or otherwise, of a nature as to make this form of recognition appropriate. The recipients of this award shall be chosen in recognition of their influence for good, their excellence in maintaining high ideals of living, their spiritual qualities, and their generous and disinterested service to others.

Superior Cadet Ribbon Awards. The Department of the Army awards annually Superior Cadet Ribbons to those Army ROTC students in each academic year (class) adjudged the most outstanding in their class.

Textile Veterans Association Award. This annual award is given to a member of the graduating class who has the potential to make an outstanding contribution to the textile industry in future years.

Third Army Certificate of Meritorious Leadership Achievement. An award is given annually by the Commanding General of Third Army to the outstanding cadet on the basis of leadership development throughout the ROTC career.

Tau Beta Pi Scholastic Award. An annual award is given to the sophomore in Engineering having the highest scholastic record.
Trustees' Medal. The Board of Trustees has provided for a gold medal to be awarded annually to the best speaker in the student body.

Virginia Dare Award. An award of $25 is given annually by the Virginia Dare Extract Company, Incorporated, to the senior majoring in Dairy Science and having the highest grade in DySc 405, Dairy Manufactures.

Wall Street Journal Student Achievement Awards. These annual awards are given to the most outstanding senior with a concentration in Agricultural Economics, School of Agriculture, and Economics in the School of Arts and Sciences.

COUNSELING SERVICES

Guidance has an important role at all levels of education and particularly so during times of transition and articulation. To assist students in this period of emotional and academic adjustment, an orientation and counseling program has been established.

At the beginning of his college career, each student is assigned to a faculty adviser selected from his academic school. They provide information on courses of study, approve class schedules, interpret academic regulations, and suggest adjustments in making satisfactory progress towards graduation.

The residence hall program is organized to cope with personal problems and questions regarding procedures and policies of college life. Residence hall counselors and supervisors are primarily concerned with maintaining an environment compatible to serious study and with the educational potential of group living.

A counseling office is located in the student center. Its services are oriented to early identification of and assistance with psychological, vocational, and personal problems. Students are encouraged also to take advantage of the individual services available through the faculty, administrative, and student affairs offices, the health service, and the student programs of the local churches.

PLACEMENT SERVICES

While the College is glad to assist all who ask for help in securing summer or permanent employment, there is no obligation to secure positions for those who complete any of the courses of study.

The Placement Office coordinates and plans campus interview visits requested by representatives seeking graduates for positions
BUILDINGS AND GROUNDS

Today, as throughout Clemson's history, the centerpiece of this picturesque campus is the Tillman Hall clock tower, the symbol of scientific education, research and public service in South Carolina. Honoring the memory of colorful Governor "Pitchfork Ben" Tillman, this building houses administrative offices on the two lower floors and classrooms upstairs.

The Clemson campus proper consists of 440 acres and represents an investment approximating 34 million dollars in academic buildings, student housing and service facilities. Basically, this is the plantation that Thomas Green Clemson willed to South Carolina for the establishment of the College. Fort Hill, the former home of both Mr. Clemson and his illustrious father-in-law, John C. Calhoun, is preserved in the center of the campus as a national shrine.

Beyond the main campus, stretching into Oconee, Pickens, and Anderson Counties, are another 23,000 acres of farm and agricultural and engineering research lands. Over the State are 4,000 more acres devoted to Agricultural Experiment Station research and 4-H Club work.

Teaching and laboratory facilities of the School of Agriculture are housed in the several buildings of the Agricultural Complex. Another grouping serves the School of Engineering. Among these are Olin Hall for Ceramic Engineering and Earle Hall for Chemical Engineering. These two buildings and the excellent equipment they house represent gifts from the Olin Foundation totaling nearly two million dollars.

Sirrine Hall is the home of the School of Industrial Management and Textile Science and within it are located government and industrial cotton fiber testing laboratories. The School of Architecture is located in a modern, well-equipped building recently completed and a third grouping of classrooms and laboratories serves the School of Arts and Sciences.
The eight dormitories for men will accommodate 3,188; one uniquely designed structure houses 2,200. The women's dormitory will accommodate 144. Individual units or apartments accommodate 400 married students.

Student welfare facilities for the more than 4,000 young men and women on the campus include the Library, Infirmary, YMCA, Laundry, Dining Room, Field House, Stadium, and service center for water, light and heat.

The college-owned Clemson House and adjacent Clemson Homes, provide excellent community hotel accommodation and permanent housing for staff members.

**RESERVE OFFICERS' TRAINING CORPS (ROTC)**

The Department of the Air Force and the Department of the Army both maintain Senior Division units of the ROTC at Clemson.

The mission of the Reserve Officers' Training Corps is to produce junior officers having qualities of leadership and attributes essential to their progress and continued development as commissioned officers in either the Air Force or the Army of the United States.

To implement this mission, a 4-year program is offered consisting of the basic course for freshmen and sophomores and the advanced course for juniors and seniors.

The basic course, consisting of the first two years of Air or Military Science, is a requirement in every undergraduate curriculum of the College and as such must be taken the same as other required freshman and sophomore courses and completed for graduation. Entering students are permitted to enroll in the service of their choice.

Students enrolling in college for the first time and transfer students not otherwise excused are expected to register for and attend scheduled military classes (Basic Course ROTC) in the first and succeeding semesters of residence until military training requirements have been met.

The following students are exempt from the requirement of the basic ROTC course but must complete for graduation the equivalent credit hours of approved electives:

a. Students not physically and scholastically qualified for basic ROTC.

b. Students who have attained age of 21 at time of entrance.
c. Transfer students entering with 30 or more semester credit hours acceptable toward graduation at Clemson in their respective curriculums.

d. Students who are married at time of entrance.

e. Women students.

f. Students who are not citizens of the United States.

Students who have had at least six months of active military service are exempt from the basic ROTC course. However, veteran students who intend to apply for advanced ROTC should consult with the Head of the Military Science or Air Science Department with reference to placement credit for previous service.

Physically qualified students who are exempt from the basic course for other reasons may elect to take the freshman and sophomore courses in Air or Military Science upon approval of the Head of the Air or Military Science Department concerned.

Good moral character and the signing of a loyalty certificate are prerequisites for enrollment and continuance in the ROTC.

Students who complete the prescribed ROTC courses and receive a bachelor's degree may be awarded commissions in either the Air Force or Army Reserve. Each student receives 1 credit hour for each semester of the basic course and 3 credit hours for each semester of advanced ROTC successfully completed. Only 6 credit hours for advanced ROTC will be applicable toward a degree.

Members of the advanced course are required to attend one summer camp between the junior and senior years. All students attending camp are paid at the rate of $78 per month, reimbursed for travel at the rate of $0.05 per mile for the round trip, and are fed, housed, uniformed, and receive medical attention at government expense while at camp. The Air Force encampment is normally of 4 weeks duration and the Army encampment is normally of 6 weeks duration.

The statutory requirements for enrollment in the ROTC are that the student must be a citizen of the United States, physically qualified by standards as prescribed by the Departments of Air Force and Army and accepted by the institution as a regularly enrolled student.

Currently, uniforms are provided basic ROTC students. A deposit of $25 is required from each student. This is refundable when the uniform is turned in, provided there is no damage to the uniform other than normal wear.
Each advanced ROTC student is credited with $100, paid to the College, which is used by the College to purchase officer-type uniforms for use during the junior and senior years. The uniform becomes the property of the student when he receives a commission. Advanced ROTC students also receive commutation in lieu of subsistence at the rate of $0.90 per day for not more than 595 days. Veterans are paid these allowances in addition to the benefits authorized by the Veterans Readjustment Assistance Act if they are enrolled in the ROTC courses. In addition to all of the above benefits, provisions have been made to defer from Selective Service induction those advanced ROTC students who satisfactorily participate in the program. A deferment agreement permits the student to complete his course of instruction, but requires that he accept a commission, if offered, to serve on active duty as an officer for a period depending on the service in which he is commissioned, and to satisfy the regular or reserve requirements as prescribed by law.

Rifle Team. The College rifle team consists of members of the Air and Army ROTC units and civilian members of the student body. In addition, there is a separate Army ROTC team. The teams compete in the Hearst Matches and the National Intercollegiate Matches. Both postal and shoulder matches are fired each year with other colleges and universities. The firing is conducted with modern smallbore target rifles on an indoor range.

AIR FORCE ROTC

The mission of the Air Force ROTC is to develop in selected college students, through a permanent program of instruction at designated civilian educational institutions, those qualities of leadership and other attributes essential to their progressive advancement to positions of increasing responsibility as commissioned officers in the United States Air Force.

The purpose and specific objectives of the program are:
(1) To select and motivate cadets to serve as career Air Force officers in fields as specifically required by the United States Air Force.
(2) To develop in cadets by precept, example, and participation the attributes of character, personality, and attitudes essential for leadership.
(3) To develop in cadets an interest in, and understanding of, the Air Force mission, organization, operations, problems, and techniques.
(4) To provide that military education and training which will give cadets a general background and sound foundation on which to build an officer career.

(5) To select and motivate cadets for career fields as specifically required by the United States Air Force.

The Air Force ROTC program at Clemson College consists of the basic and advanced courses. Both courses are generalized in nature and are designed to give the student a broad picture of the Air Force organization and mission and to stimulate a growing desire on the part of the student to enter the Air Force. The basic course consists of 2 years with 60 hours of classroom instruction and 30 hours leadership laboratory each year.

During the second year of the basic course a cadet may apply for admission into the two-year advanced course. The advanced course consists of 150 hours of instruction each year, 120 hours classroom instruction and 30 hours leadership laboratory, and 232 hours of summer training instruction at an Air Force base. If accepted into the advanced AFROTC course, the cadet will be placed under contract and after satisfactory completion, he will be commissioned a Second Lieutenant, United States Air Force Reserve. He will be called to active duty for a period of 5 years as a pilot or navigator; 4 years as a nonflying officer; or 3 years if having had previous satisfactory active duty service.

Cadets of this detachment are permitted to make orientation flights in USAF aircraft. These flights are usually in the local area, but field trips to other AF bases are accomplished from time to time. This enables cadets to see bases from all aspects of daily operation.

The entrance requirements into the advanced program are directly governed by the officer Manning requirements of the Air Force. To become eligible for the advanced program a cadet must: (1) Make application; (2) Pass the Air Force Officer's Qualification Test; (3) Pass the Air Force Physical Examination; (4) Possess leadership ability and good moral character; (5) Be classified as an academic junior and possess a minimum cumulative grade-point ratio of 1.90. Initial selection of students accepted by the advanced program, based on the quota allocated by higher headquarters, is made during the summer prior to their junior year. Final selection is announced on registration day of their junior year.

Cadets accepted for the advanced program are identified in one of six specific categories:
Category IP—Pilot Training: To be eligible for this category an advanced cadet must meet the required physical standards, measured aptitude and interest qualifications, and sign a 5-year Career Reserve Statement.

Category IN—Navigator Training: To be eligible for this category an advanced cadet must meet the required physical standards, measured aptitude and interest qualifications, and sign a 5-year Career Reserve Statement.

Category II—(Non-Flying) Technical Fields: This category consists of cadets enrolled in college programs leading to baccalaureate degrees, with majors in prescribed engineering and scientific fields of study, who meet physical standards for an Air Force commission and are selected for the advanced course. Cadets commissioned in this category are obligated for four years active duty.

Category III—(Non-Flying) Non-Technical Fields: This category consists of cadets enrolled in college programs leading to a baccalaureate degree, with majors in other than engineering and scientific fields of study and are identified as possessing outstanding officer potential, and above average academically. Cadets commissioned in this category are obligated for four years active duty.

Category IV—Prior Service: This category consists of service exempt cadets who have served on active duty for training and satisfied the requirements of selective service, awarded a degree and have been individually approved by higher headquarters. Cadets commissioned in this category are obligated for three years active duty.

Cadets in the advanced course are entitled to subsistence at the rate of $0.90 per day for approximately 600 days. Subsistence allowance is paid for the following periods: (1) From first day of fall semester to day before first day of summer training, including vacation periods; (2) From day after final day of summer training to and including day of commissioning. Payrolls are submitted quarterly and checks are normally received by cadets during last week of January, April, July, and October.

Cadets enrolled in the advanced course will attend a four-week training period at an Air Force base between their junior and senior years. This period is designed to give them an idea of how a typical air base functions, and to provide them with an opportunity to fly in USAF aircraft. In addition to several hours of orientation flying, they will visit and train on the job in such basic activities as headquarters sections, maintenance shops, base operations, and others.
Summer training curriculum is designed to provide training and actual experience which will prepare them to assume cadet officer positions in their senior year.

Quarters, meals, uniforms, and medical care will be provided free. Cadets are provided rail or bus transportation to and from the air base. If cadets drive their car, they are paid mileage at the rate of $0.05 per mile from their official residence to the base and return. In addition, they will receive $72 for the 4-week training period.

Those cadets who have demonstrated outstanding leadership qualities and are in the upper one-half of their class academically may be designated as Distinguished AFROTC Cadets at the beginning of the senior year. These designations are made upon recommendation by a board of Air Force officers and the College Director of Admissions and Registration and are concurred in by the President of the College and Head of the Air Science Department.

Those cadets officially designated as Distinguished AFROTC Cadets may apply for a Regular Air Force commission between 1 October and 31 October. The cadet is competing with all other Distinguished AFROTC Cadets, nationwide, for a Regular Air Force commission. If selected for appointment in the Regular Air Force, Distinguished AFROTC Cadets must be designated as a Distinguished AFROTC Graduate upon graduation. Those Distinguished Cadets who continue to maintain outstanding progress in the senior year are designated as Distinguished Graduates.

All AFROTC graduates are eligible to apply for a Regular Air Force commission after 18 months active duty.

**ARMY ROTC**

The Army ROTC instruction stresses an academic college level program in content, scope and intensity. Emphasis is placed on the development of the student's leadership potential. Thus, a student absorbs many qualities of leadership, bearing, discipline, judgment, and sportsmanship which will be a distinct asset in any profession that he may choose, military or civilian.

The general Military Science program is conducted at Clemson; this program qualifies the student for a regular or reserve commission in any of the arms or services of the United States Army. The student who successfully completes the Army ROTC, subject to his desires and the needs of the service, may receive a commission in a branch closely allied to his major field of academic study.
During the fourth year of general military instruction, students will have the opportunity to indicate their preference for assignment to a particular branch. Final assignment must remain with the Department of the Army and will be dependent upon such factors as the student’s major academic course, class standing, qualities of leadership, the requirements and existing vacancies in the various branches of the Army, in addition to the student’s choice.

The student who receives his commission through Army ROTC is appointed in the Army Reserve as a Second Lieutenant and called to active duty for 2 years or to active duty for training for 6 months. During his senior year the student may indicate his preference for either period; the final decision is based on the student’s desire and the needs of the service. A period of active duty for training requires that the student retain his reserve commission and remain in the Ready Reserve until the eighth anniversary of the receipt of his commission. Graduates of the program who enter active duty for 2 years will acquire a 6-year military obligation, only 3 of which would be in the Ready Reserve.

Outstanding Army ROTC cadets who attain grades in the upper half of the class in academic subjects and the upper third in Military Science subjects during their junior year and who possess outstanding qualities of leadership, character and aptitude for military service may, with the approval of the College President, be designated as Distinguished Military Students by the Head of the Military Science Department. Those who maintain this outstanding record during their senior year may be designated Distinguished Military Graduates. A Distinguished Military Graduate may apply for appointment as a Second Lieutenant in the Regular Army.

A student who has successfully completed the basic course, meets the physical requirements, has earned sufficient academic credits to be designated as an academic junior, and is recommended by his instructors, may enter the advanced course offered during the junior and senior years.

The requirements for formal enrollment in the advanced ROTC program are as follows:

Junior Year. Must have successfully completed all previous Military Science courses, have acquired a passing grade on a general intelligence test which is administered during the sophomore year, be physically qualified, and must have acquired the minimum grade-point ratio required for designation as an academic junior. The number of credits required for participation in the advanced
course complements the academic requirements of the school and insures that the cadet receives his commission and his diploma simultaneously after four years of work.

Senior Year. Must have successfully completed all previous Military Science courses and have attended summer camp, must be an academic senior, and have the cumulative grade-point ratio required for graduation.

Exceptions to the above general rules may be made by the Head of the Military Science Department.

Participation in the ROTC program in any status does not preclude the possibility of belonging to an organized Reserve Unit or to the National Guard. Membership in such units counts toward longevity for pay purposes, and definitely benefits over-all knowledge in military subjects. Students desiring enrollment in the advanced Army ROTC program must, however, transfer their reserve affiliation from active to inactive (Control Group) status or else request dual status from their respective units.

RELIGIOUS LIFE

There are six active churches at Clemson—Baptist, Methodist, Presbyterian, Lutheran, Episcopal, and Roman Catholic. Each of these churches has a program especially for college students. Five of them have full-time student workers in addition to the work of the minister.

Regular courses in Religion are offered for credit as electives. These courses are taught by ministers of the local churches. For information regarding these courses, see the description of courses.

The Clemson Y.M.C.A. has supervision of voluntary religious activities of the students, and contributes to the religious, social and physical life of the college community. The Y.M.C.A. building provides a meeting place for denominational groups not having a church at Clemson, as well as for many interdenominational and civic groups.

The Student Center in the new dormitory contains a student chapel with a Hammond organ.

HISTORICAL STATEMENT

In 1889 the General Assembly of South Carolina accepted the bequest of Thomas G. Clemson, which set aside the bulk of the Clemson estate for the founding of a scientific and technical college. The institution was also established under the Morrill Land-Grant
Act passed by the National Congress in 1862. Clemson College, therefore, is the Agricultural and Mechanical College of South Carolina and is a member of the national system of Land-Grant Colleges and Universities.

The nature of the institution is outlined in Mr. Clemson’s will and its acceptance by the legislature.

The will in part reads:

Feeling a great sympathy for the farmers of this State, and the difficulties with which they have to contend in their efforts to establish the business of agriculture upon a proper basis, and believing that there can be no permanent improvement in agriculture without a knowledge of those sciences which pertain particularly thereto, I have determined to devote the bulk of my property to the establishment of an Agricultural College upon the Fort Hill Place. My purpose is to establish an Agricultural College which will afford useful information to the farmers and mechanics; therefore it should afford thorough instruction in agriculture and the natural sciences connected therewith; it should combine, if practicable, physical with intellectual education; and should be a high seminary of learning in which the graduate of the common schools can commence, pursue and finish a course of studies terminating in thorough theoretic and practical instruction in those sciences and arts which bear directly upon agriculture . . . but to always bear in mind that the benefits herein sought to be bestowed are intended to benefit agriculture and mechanical industries. . . . I trust I do not exaggerate the importance of such an institution for developing the material resources of the State, by affording its youth the advantages of scientific culture.

The desire to establish such a school or college, as I have provided for in my said last will and testament, has existed with me for many years past, and many years ago I determined to devote the bulk of my property to the establishment of an Agricultural School or College. To accomplish this purpose is now the one great desire of my life.

This will gave all that part of the Fort Hill Estate inherited by Mrs. Clemson from her mother and the bulk of Mr. Clemson’s other real and personal property. The latter amounted to a sum, which, considering the purchasing power at the time, probably has been only a few times exceeded in a public benefaction in South Carolina.

A Board of Trustees of seven members was provided for: R. W. Simpson, D. K. Norris, M. L. Donaldson, R. E. Bowen, B. R. Tillman, J. E. Wannamaker, and J. E. Bradley, who with those chosen by the General Assembly, should constitute a governing board in case the State accepted the bequest; but, who, in case the State declined the bequest, should alone constitute a governing board for a private institution.

These seven trustees, along with other friends of the movement, and the agricultural groups in the State developed and organized a public opinion favorable to the plan.
In November, 1889, the General Assembly of South Carolina accepted the terms of the will and, following the decision of the United States Supreme Court to uphold the will, the State of South Carolina and the full Board of Trustees proceeded to convert the dream of Thomas G. Clemson into the reality of Clemson College.

The College was formally opened in July, 1893, with an enrollment of 446 students. The first graduating exercises were held in December, 1896, with a graduating class numbering 37—15 in the agricultural courses and 22 in the engineering courses.

LOCATION

The College is located on the Fort Hill homestead of John C. Calhoun, in the foothills of the Blue Ridge Mountains. It has an elevation of 800 feet above sea level and commands an excellent view of the mountains to the north and west, some of which attain an altitude of over 5,000 feet.

The College is located at Clemson, S. C., on the main line of the Southern Railway. U. S. Highways numbers 76 and 123 pass through Clemson, and daily bus service at regular intervals is available.

ALUMNI RELATIONS

The office of alumni relations coordinates all functions and services of the alumni office. The director of alumni relations is secretary of the Clemson Alumni Association and the Clemson Foundation through election by the governing boards of these two organizations.

Accurate records of addresses and information concerning alumni are being compiled by this office which also publishes a magazine and newsletter for distribution to the alumni.

The purpose of the Alumni Association is to serve the College and its alumni in every possible way. The Association holds its regular annual meeting at the College each June. Active membership is made up of former Clemson students who participate in the Clemson Alumni Loyalty Fund for the purpose of providing supplementary financial aid to the educational programs of the College.

The Clemson College Foundation was founded by interested members of the Alumni Association to raise an endowment to be used for the benefit of the College, its students, faculty and alumni. Trustees of the Foundation are elected by the Association.
THE J. E. SIRRINE TEXTILE FOUNDATION

Funds in this foundation were contributed by the members of the textile industry in South Carolina and amount to about one million dollars. Income from this fund is administered by the trustees of the J. E. Sirrine Textile Foundation. They have used the income to benefit textile teaching and research at Clemson College. Under the present system it is used to (1) supplement the state retirement benefits for faculty members, (2) supplement college travel funds for faculty members, (3) pay half the salary of staff members in research, (4) sponsor the school library by paying the salary of the librarian and paying for periodicals and books.
PART III

STUDENT LIFE
AND ACTIVITIES
PART III—Student Life and Activities

CLUBS AND SOCIETIES

Honor Fraternities. Honorary professional organizations, including Tau Beta Pi, Sigma Tau Epsilon, Phi Psi, Alpha Zeta, Alpha Tau Alpha, Iota Lambda Sigma, Sigma Pi Sigma and the Minarets, give recognition to superior work done by Engineering, Arts and Sciences, Textile, Agricultural, Agricultural Education, Industrial Education, Physics, and Architecture students, respectively.

The Phi Kappa Phi, honor society, and the Phi Eta Sigma fraternity both have chapters at Clemson. The former is an all-college honor organization composed of seniors and second semester juniors. The latter is a freshman organization with members selected from students who attain a high scholastic standing during the first semester of their freshman year.

Engineering Societies. Outstanding students majoring in engineering courses are selected for membership in the Student Chapter of the American Institute of Electrical Engineers-Institute of Radio Engineers, American Society of Mechanical Engineers, American Society of Civil Engineers, American Institute of Chemical Engineers, American Ceramic Society, American Society of Industrial Engineers, American Society of Agricultural Engineers, and the Society of American Military Engineers.

Societies in the School of Industrial Management and Textile Science. Students majoring in this school have several societies that they may join. There are three student chapters of national societies which are open to students of the School.

1. The American Association for Textile Technology is open to students in the Textile Management and Textile Science curriculums.
2. The American Association of Textile Chemists and Colorists is open to students in the Textile Chemistry curriculum.
3. The Society for the Advancement of Management is open to students in Industrial Management, Textile Management, Textile Science and Textile Chemistry.

In addition to these student chapters of national societies, the Industrial Management Society is a local club for students in Industrial Management.
Music Activities. The Clemson College Glee Club is open to Clemson students who are interested in formal singing activities. Throughout the year the Glee Club performs on the Clemson campus for such activities as Religious Emphasis Week, certain student-wide events, many state and regional organizations which hold important conventions at Clemson, and at other appropriate times.

The Blue Notes and Jungaleers are two college-recognized bands consisting of enrolled students who play for private and college-wide dances. The College also has the Tiger Marching Band, concert bands and ROTC band, and they are explained in more detail in another part of this section. Mu Beta Psi is the college-recognized fraternity composed of members of all our musical organizations.

Student Clubs. Students majoring in various courses of instruction have organized clubs. Among such clubs are the Block and Bridle Club (Animal Husbandry), American Association of Textile Chemists and Colorists, Biological Sciences Club (Biology and Entomology), Student Chapter of American Dairy Science Association, Forestry Club, Industrial Management Society, Kappa Alpha Sigma (Agronomy), Pre-Law Society, Newtonian Society (Mathematics), Poultry Science Club, the American Association of Textile Technology, and the Pre-Veterinary Club.

The Blue Key, a national fraternity based upon leadership, has a chapter at Clemson, as does Alpha Phi Omega, a national fraternity of former Boy Scouts. The Tiger Brotherhood is a local organization at Clemson which stresses the qualities of leadership. Circle K International is a student service organization sponsored by Kiwanis International, and the DeMolay Club also has a chapter at Clemson.

The College also recognizes certain regional clubs, such as the Bamberg County-Clemson Club, Beta Sigma Chi (Charleston), Central Savannah River Area-Clemson Club, and the Newberry County-Clemson Club.

The YMCA and the Clemson churches are recognized through the YMCA Cabinet and the Class Councils and organizations, such as the Baptist Student Union, Hillel-Brandeis Club, Canterbury Club, Christian Science Organization, Lutheran Student Association, Newman Club, Presbyterian Student Association and Wesley Foundation.

Military Activities and Clubs. The military activities of students are recognized through Scabbard and Blade, a national military honor fraternity, and the Pershing Rifles, a national honorary military organization. Air Force students are recognized through the
Arnold Air Society, a national Air Force honorary society. Semper Fidelis is the organization on campus that represents the Marine interest. Exhibitions of fancy drill are presented by the Pershing Rifles at football games, parades and other celebrations and ceremonies. On two occasions within the last five years, the Pershing Rifles were adjudged National Drill Champions in competition with colleges and universities throughout the country at the annual Cherry Blossom Festival, Washington, D. C. Freshmen may be selected for membership in the Freshman Platoon.

**Athletic.** The Block “C” Club includes students who have earned letters in major sports.

**Publications.** Publications at Clemson are handled by clubs and organizations which carry specific responsibility for such publications. *The Blue Key Directory* is published by the Blue Key fraternity, the *Agrarian*, by the agriculture clubs, the *Bobbin and Beaker*, by the textile fraternity, *The Slip Stick*, by the engineering societies, *YMCA Handbook*, under the direction of the YMCA Cabinet, *The Tiger*, College newspaper, and *The Taps*, College annual, are published by staffs that carry responsibilities for those publications, and the *Chronicle*, the College humor magazine, has a staff made up of interested and talented students.

**Radio.** Radio Station WSBF, a 10-watt FM and AM closed-circuit operation, is managed entirely by a student staff. It offers training for announcers, program organization, script writing and engineering.

**ARCHITECTURAL FOUNDATION LECTURES AND EXHIBITS**

The School of Architecture at Clemson is able to present annually an outstanding series of lectures, which are open to all Clemson students, through financial grants from the Clemson Architectural Foundation. The Foundation also presents an annual schedule of at least 12 art exhibits in the Architectural School gallery, which is open to the public weekdays between 9 a.m. and 4:30 p.m.

**COLLEGE BANDS**

There are three bands open to members of the student body. An entrance audition is the only prerequisite to membership. Instruments are available for those who need them and are furnished without cost.
Tiger Band. The Tiger Band and Color Guard, composed of approximately 100 members, participate in football games, pep rallies, college functions, and parades throughout the South. This band has appeared in major stadiums in many states, including the Gator, Orange, Sugar, and Bluebonnet Bowls and has performed on national television. The Tiger Band makes several out-of-town trips during the fall season. A smaller "pep band" from its ranks performs at all home basketball games. Members of the Tiger Band report to the campus a few days before registration in the fall for intensive pre-school training. Membership is open to all members of the student body.

Concert Band. The Clemson College Concert Band is composed of the better musicians on campus. It is formed at the end of the football season, and gives concerts both on and off the campus, including a tour in the spring. This organization plays music of the great composers in addition to lighter fare. Membership is open to the entire student body.

Army ROTC Band. Talented students, members of the Tiger Band and Concert Band are encouraged to join the Army ROTC Band. This band participates in all major military functions, including ceremonial parades and reviews. Admission is open to all Army ROTC personnel.

Concert Series

The College, through the Concert Committee, brings to the campus each year a series of musical programs. This program is financed through the student activity fee and through the sale of tickets to individual subscribers.

Listed below is the program of concerts offered in 1962-1963:
Royal Scots Greys and Argyll and Sutherland Highlanders
Goldovsky Grand Opera Theater presentation of "La Traviata"
Detroit Symphony Orchestra with Augustin Anievas, Piano Soloist
Jose Greco and His Spanish Ballet
Richard Dyer-Bennet, Tenor and Ballad Singer

The Student Center

The student center has a student lounge with space for reading and games, a television set, and music rooms. On the third floor there are meeting rooms and the student chapel. Also in this area are the offices of student publications, such as The Tiger, student newspaper; The Taps, College annual; the engineering magazine,
The Slipstick, and Radio Station WSBF. The visitors' lounge and the information center are on the first floor.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION

Serving both college and community the Clemson YMCA promotes growth in Christian character through a well-balanced program of religious, social, recreational, and counseling activities.

Religious activities cut across many areas of college life. Some of these activities are vesper services on Sunday afternoon, daily devotions in the student chapel, residence hall forums and prayer groups, and the participation in and joint sponsorship of the annual campus-wide Religious Emphasis Week program. Student program deputations are exchanged with other colleges and high schools and churches in the area. The YMCA cooperates with local church groups in the over-all religious program.

The “Y” offers adequate space and facilities for drop-ins, dances, television, piano entertainment, weight lifting, basketball, swimming, movies, and many other social and recreational activities. The student chapel, which is located in the residence halls, is open twenty-four hours a day for individual and group worship. Appointments, in addition to the ones held in their offices, may be kept with local ministers in the counseling rooms within the chapel.

In addition to the full-time staff, the YMCA program is coordinated by a student cabinet and councils which are representative of the undergraduate classes. These groups organize and continually evaluate “Y” activities. The over-all function of the YMCA is determined by a board of directors.

AUTOMOBILE PRIVILEGES AND PARKING REGULATIONS

All motor vehicles owned and operated on the campus by students, faculty, and staff members must be registered with the designated College authorities. On registering, each student, faculty, or staff member will be given a copy of the parking and traffic regulations and will be issued a decal which will indicate the areas in which the car may be parked.

A student’s academic work is often adversely affected by his having and using an automobile. Accordingly, the College has adopted a policy that all students classified as freshmen, regardless of the number of years they have attended college, will not be permitted to operate or park any motor vehicle within a five-mile radius of the center of the campus except on special occasions as
designated from time to time by the College administration. The penalty for violating the freshman rule is severe. Upon petition by the student to the Dean of Student Affairs, exceptions may be made for commuting students living at home and for students physically handicapped.

All upperclassmen and their parents are urged to give serious consideration to whether the student should bring an automobile to the campus, especially if residence is in a college dormitory.

ATHLETICS

All students are urged to take part in the intramural sports program conducted by the Athletic Department. This program includes touch football, basketball, volleyball, and softball.

It is the policy of the College to sanction and encourage athletics so long as participation does not interfere with studies and other duties. Football, baseball, basketball, and track are the most popular sports.

The College is a member of the Atlantic Coast Conference. In order to participate in intercollegiate athletics, the student must meet the requirements of the Atlantic Coast Conference as well as the requirements of the College.

Upon payment of the student activity fee, a portion of which is allocated to the Athletic Department, a non-transferable card is issued which entitles the student to admittance to all home athletic contests.

No member of an athletic team is eligible for a managerial position in any other branch of sport.

No team is allowed to leave the College grounds to participate in any match game unless accompanied by the authorized coach or other member of the faculty, who shall be responsible to the College for the conduct of the players while away.

No student is eligible to participate in an intercollegiate contest who is away from the College without proper authority or without having complied with all the rules or orders issued by the President regarding such matters.
PART IV—Scholastic Regulations

SCHOLASTIC REGULATIONS

Academic Standards. Proper discharge of all duties is required at Clemson College, and a student's first duty is his scholastic work. All students should be thoroughly acquainted with and cognizant of these basic requirements.

The Credit System. The semester hour is the basis of all credits. Generally, one recitation hour or 3 laboratory or shop hours a week for a semester constitute a semester hour. Thus, in Engl 101, English Composition, 3 cr. (3.0), as you will find this subject listed in the Degrees and Curriculums, the student takes 3 semester hours. When he completes this course satisfactorily, he is granted 3 semester credit hours on his record. The notation "3 cr. (3.0)" means that the course carries 3 credits, has 3 clock hours of theory or recitation per week, and no laboratory hours. Ch 101, General Chemistry, 4 cr. (3,3), carries 4 semester hours, has 3 hours of theory, and a 3-hour laboratory period.

The amount of work required for each credit will vary with the student's capabilities. In general, it is anticipated that each semester hour credit will require 3 hours work per week for average students. Thus, a 1(1,0) course would have 1 hour of lecture per week and require 2 hours of outside preparation. A 1(0,3) course would require 3 hours of laboratory work and no time for outside preparation.

Semester Grades. The standing of a student in his work at the end of a semester is based upon daily class work, tests or other work, and the final examinations. Faculty members may excuse from the final examinations all students having the grade of A on the work of the course prior to the final examination, but for all other students written examinations are required in all subjects at the end of each semester, except in certain laboratory or practical courses in which final examinations are not deemed necessary by the department faculty.

Scholastic reports are mailed to parents four times each year, including a preliminary statement of progress near the middle of each semester, and a final report at the end of each semester.

The Grading System. The grading system is as follows:

A—Excellent. Indicates that the student is doing work of a very high character. The highest grade given.
B—Good. Indicates work that is definitely above average, though not of the highest quality.

C—Fair. Indicates work of average or medium character.

D—Pass. Indicates work below average and unsatisfactory. The lowest passing grade.

E—Conditioned. Indicates a failure to satisfy the requirements as to daily recitations, tests or other work, as well as to the final examination, which condition in the opinion of the instructor may be made up by re-examination at some fixed time.

F—Failed. Indicates that a student knows so little of the subject that it must be repeated in order that credit may be received.

I—Incomplete Work. Indicates that a relatively small part of the semester’s work remains undone. Grade I is not given a student who has made a grade F on his daily work. Students are allowed 30 days after the beginning of the next semester in which the student is enrolled to remove the incomplete grade unless (1) an extension of time is approved by the instructor concerned and the Director of Admissions and Registration, or (2) within one year of residence after receiving such a grade, a student repeats the conditioned course satisfactorily at Clemson, in which case no credit hours taken shall be recorded for the grade of I. A student who elects to repeat an incomplete course is responsible for notifying the Office of Admissions and Registration of his election during the semester in which the course is taken.

In order to make up incomplete work, the student must first obtain a permit card from the Office of Admissions and Registration. This card serves as the authority for the removal of the I and also as a form for reporting the final grade.

WP—Withdrew Passing. This grade indicates that the student withdrew from the course while doing satisfactory work. No credit hours taken are recorded for the grade of WP provided that the course is dropped prior to the last three weeks of classes in the semester. Only semester grades shall be given and recorded for courses dropped during the last three weeks.

WF—Withdrew Failing. Indicates that the student withdrew from the course while doing unsatisfactory work. The credit hours of a subject on which the grade of WF is received are counted as credits taken in computing the student’s grade-point ratio.

Dropping Class Work. A subject dropped after the first four weeks of class work is recorded as “Withdrew Passing” or “With-
drew Failing” depending upon the student’s grade in the course at the time the subject was dropped.

Upon the recommendation of the instructor and the dean concerned, a student’s standing will be investigated and he may be required to drop a subject because of neglect, or lack of application or preparation. No student will be dropped under this rule without approval of the President.

E—Conditioned Work. Only one opportunity shall be given a student to remove a condition (E) by a re-examination. A student who fails to pass such a re-examination shall be required to repeat the subject, hour for hour in class. No more than 12 credit hours of conditions for a session shall be removed by re-examination. A student shall not receive a grade higher than D when a deficiency is removed by re-examination.

Students who made grades of E may stand re-examinations within 30 days after the beginning of the next semester in which the student is enrolled and at the convenience of the instructor unless (1) an extension of time is approved by the instructor concerned and the Director of Admissions and Registration, or (2) within one year of residence after receiving such a grade, a student repeats the conditioned course satisfactorily at Clemson, in which case no credit hours taken shall be recorded for the grade of E. A student who elects to repeat a conditioned course is responsible for notifying the Office of Admissions and Registration of his election during the semester in which the course is taken.

Removal of Failures. A student who has failed (made a grade F) in a subject cannot receive credit for that subject until it has been satisfactorily repeated hour for hour in class, except that in the case of correlated laboratory work, the number of hours to be taken shall be determined by the instructor. Where separate grades for class and laboratory work are given that part of the subject shall be repeated in which the failure occurs.

Rescheduling Courses Failed. A student who wishes to reschedule a course he has failed must do so within his next year of residence, or, if the course is not offered during this year of residence, he must reschedule the course the first time it is offered thereafter during his attendance at Clemson.

Rescheduling Courses Passed. A student may repeat a course he has passed with a grade lower than B provided he does so within three semesters of residence after the completion of his original enrollment in the course.
Scheduling Remedial Mathematics. Any student who has passed a course in freshman mathematics is ineligible to enroll in Remedial Mathematics.

Withdrawal from College. A student may withdraw from the College any time before the last three weeks of classes in the semester without having grades recorded. A student enrolled the last three weeks of classes shall have final semester grades recorded.

A student withdrawing from College after preliminary reports are due must be passing a minimum of 12 semester credit hours at the time of withdrawal to qualify for re-enrollment the following semester.

After the first withdrawal from College the student is eligible to continue his enrollment the following semester, provided he meets other applicable regulations. For each succeeding withdrawal, however, the student shall be ineligible to continue his enrollment the following semester unless there are extenuating circumstances approved by the Committee on Admissions.

Grade Points Four grade points are assigned for each credit hour on which the student receives the grade of A, 3 grade points for each credit hour of grade B, 2 grade points for each credit hour of grade C, and 1 grade point for each credit hour of grade D. No grade points are assigned for grades E, F, I, WP, or WF.

Grade-Point Ratio. In calculating a student's grade-point ratio, the total number of grade points accumulated by the student is divided by the total number of credit hours taken by the student during the semester, session or other period for which the ratio is calculated.

Minimum Requirements for Continuing Enrollment. At the end of the academic year in June, all student records are inspected for quality. At that time in order to be able to continue his enrollment, a student who has taken a total of:

(a) 24 to 59 credit hours at Clemson must have a cumulative grade-point ratio of 1.00 or above.
(b) 60 to 89 credit hours at Clemson must have a cumulative grade-point ratio of 1.30 or above.
(c) 90 or more credit hours at Clemson must have a cumulative grade-point ratio of 1.50 or above.

A student who has taken fewer than 90 credit hours at Clemson and who fails to meet the required grade-point ratio, as indicated in the table above, may apply for readmission after a minimum of one semester has elapsed. A student who has taken 90 or more
credit hours and fails to meet the required grade-point ratio is permanently ineligible for readmission.

Effective in September 1963, all students, regardless of original entry date, must meet the 1.00, 1.30, 1.50 requirements for continuing enrollment in order to enroll for the 1963-1964 session.

Effective in September 1964, a student in order to enroll for the 1964-1965 session must meet continuing enrollment requirements of 1.20, 1.40 and 1.60, respectively.

Advanced Placement by Examination. In addition to earning credit by the usual method involving classroom attendance, students may receive credit toward their degree by completing a course successfully by examination only. Freshmen interested in exempting some of the elementary courses in this manner should participate in the College Board Advanced Placement Examination program, and have the results of these tests sent to Clemson.

Credit by Examination. Credit may be earned by means of a special examination without the necessity of class attendance subject to the following requirements:

(1) The applicant must present evidence which would indicate that he has received training or taken work which is approximately equivalent to that given in the course at Clemson for which an examination is requested and that an examination is warranted.

(2) The applicant must not have previously failed or audited the course at Clemson.

(3) The applicant must apply in writing for the examination and the request must be approved by the Instructor, Head of the Department in which the course is taught, Dean of the School in which the course is taught, and the Director of Admissions and Registration.

(4) A grade of not less than C on the examination is necessary in order for the examinee to receive credit on the course. An examinee receiving credit under this provision receives credit for "hours taken," "hours earned," and grade points as well as the course grade.

(5) The time of the examination will be arranged by the student with the instructor concerned, but must be taken within one month after the date of final approval or it will be necessary for the student to initiate another request.

Work Taken at Another Institution. Clemson students may receive credit for work taken at another institution; however, approval of the work should be obtained by the student prior to scheduling the work. Information and forms relative to this approval may be
obtained in the Office of Admissions and Registration. By obtaining advance approval the student is assured of receiving proper credit at Clemson provided he passes the work with a grade one letter grade higher than the lowest passing grade.

Classification. All new students are classified as freshmen unless they have attended another college prior to entrance and have completed sufficient scholastic work as to enable them to complete the requirements for graduation from Clemson in not more than three regular sessions. No new undergraduate student, however, may be classified higher than a sophomore until one semester has been completed at Clemson.

To be classified as a sophomore, a student must have completed at least 30 semester credit hours and must have a grade-point ratio of 1.50 or above.

To be classified as a junior, a student must have completed at least 64 semester credit hours and must have a grade-point ratio of 1.60 or above.

To be classified as a senior, a student must have completed at least 95 semester credit hours and must have a grade-point ratio of 1.70 or above.

Regular Advancement in Classification. All students are urged to meet the requirements for sophomore classification by the beginning of the second year, for junior classification by the beginning of the third year, and for senior classification by the beginning of the fourth year. Failure to meet these requirements can jeopardize a student's academic standing with the College as well as jeopardize his deferment under selective service even though he may be otherwise eligible for the deferment.

Course Prerequisites. Prerequisites for individual courses are enumerated under the course listings in the Description of Courses. In addition to these requirements, schools and departments may also establish other standards as conditions for enrollment. In the School of Engineering a grade-point ratio of 1.60 or higher is required for registration in all (1) Engineering courses numbered 300 or higher, and (2) Industrial Education courses numbered 300 and higher.

Maximum Credit Load. The number of credits which a student may schedule in a semester is governed by his grade-point ratio—the cumulative ratio or the ratio for the previous semester, which-
ever is higher. The entering freshman is restricted to the requirements of his course. Under this system, class advisers have the authority to restrict the student to any one of the following limits as indicated for each ratio:

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<tr>
<th>Grade-Point Ratio Required</th>
<th>Maximum Credit Hours Which May be Scheduled as Advised by Class Adviser</th>
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<tr>
<td>0.00 to 0.49</td>
<td>14, 15, or 16</td>
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<td>0.50 to 0.99</td>
<td>15, 16, or 17</td>
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<td>1.00 to 1.49</td>
<td>16, 17, or 18</td>
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<tr>
<td>1.50 to 1.99</td>
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<td>21, 22, or 23</td>
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<tr>
<td>4.00</td>
<td>22, 23, or 24</td>
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Students who lack more than 50 credits of meeting requirements for graduation are restricted to the regular credit limits determined by grade-point ratios.

Students who are within 50 credits of the requirements for graduation who wish to take credit loads in excess of the grade-point ratio limits may request permission for excessive registration, with such requests to be approved or disapproved by the student's Class Adviser and Dean.

If any student schedules excessive credits, he will be automatically dropped from a sufficient number of subjects to reduce his total credits within the limits. If for any reason a student's excessive registration continues throughout the semester, his credit on one or more subjects passed will be cancelled at the end of the semester.

**Minimum Credit Load.** When any full-time student reduces his credit load below 12 hours, but is still carrying 9 or more, he may be suspended for at least the remainder of the semester upon recommendation of the Dean of Student Affairs and approval of the President. When a student reduces his credit load below 9 hours he shall be suspended for at least the remainder of the semester.

**Auditing Policies.** Qualified students may audit courses upon the written approval of the professor, head of the department and the dean of the school concerned, and registration with the Director of Admissions and Registration. Auditors are under no obligation of regular attendance, preparation, recitation, or examination and receive no credit. Participation in classroom discussion and laboratory
exercises by auditors is at the discretion of the instructor. A student who has previously audited a course is ineligible for credit by examination.

A full-time undergraduate student with approval may audit courses at no additional charge as long as the student’s credit load, including the course audited, does not exceed his authorized limit.

A graduate student regularly enrolled for a minimum of six semester hours may with approval audit one additional course without charge.

Members of the College teaching staff and the professional staff in research and agricultural extension may with approval audit courses without charge. Other full-time College employees may audit without charge with the additional approval of the employee’s immediate supervisor and the Comptroller.

Residence Requirement for Graduation. In order to qualify for an undergraduate degree, a student must spend at least the last year of residence at Clemson and complete at Clemson a minimum of 30 of the last 36 credits presented for the degree.

Quality Requirements for Graduation. For graduation in the calendar year 1963, a cumulative grade-point ratio of 1.80 will be required. In 1964, 1965, 1966, and 1967 a cumulative grade-point ratio of 1.90 will be required.

Honors Program. The Honors Program at Clemson College provides for the fuller development of our most able students. They meet in small classes with outstanding professors and explore the subject matter of a course in greater depth than other students are able to do. The identification and selection of Honor Students begins with their freshman year, and Honors courses are provided at all four levels of undergraduate instruction. To remain in the Honors Program a student must maintain a cumulative grade-point ratio of 3.00.

An Honors Council composed of faculty members from each School is responsible for planning and supervising the Honors Program.

Honors and Awards Day. Each spring an Honors and Awards Day is held for students who qualify for the honor list and for special awards. A cumulative grade-point ratio of 3.00 to 3.49 is required for listing with honor, 3.50 to 3.79 for high honor, and 3.80 or above for inclusion with highest honor.
Honor Graduates. Students who graduate in the Honors Program will have this fact indicated on their diplomas. Other graduates who meet the required qualifications are designated as having graduated with honor. A grade-point ratio of 3.00 to 3.49 is required for graduation with honor, 3.50 to 3.79 for high honor, and 3.80 or above for graduation with highest honor.

Examination on F Received in Last Semester. A candidate for a degree who in the semester immediately prior to graduation fails to graduate because of an F on one course taken in that semester may stand a special examination on the course provided:

(1) That the candidate can furnish evidence of having done satisfactory study for the examination.

(2) That the examination is not given until after the regular degree date.

(3) That the candidate has fulfilled, prior to the due date for candidates' grades, all other requirements for his degree except those which can be fulfilled by passing the examination.

(4) That the candidate by removing the F by examination will finish all requirements for his degree which will be awarded on the next regular date for award of degrees.

Examination on E's Received in Last Semester. A candidate for a degree who in the semester immediately prior to graduation receives one or more grades of E shall have an opportunity of removing the unsatisfactory grades only after commencement and at the convenience of the instructor or instructors concerned.

A candidate who qualifies for graduation under this regulation will be awarded his degree on the next regular date for the award of degrees.

Make-ups of I's Received in Last Semester. A candidate for a degree who in the semester immediately prior to graduation receives one or more grades of I shall have an opportunity of removing the unsatisfactory grades provided the final grades are received in the Office of Admissions and Registration by the time grades for candidates for graduation are due.

A candidate who qualifies for graduation under this regulation will be awarded his degree on the regular date for the award of degrees.
BACHELORS' DEGREES

The degree of Bachelor of Science is awarded to those students who satisfactorily complete one of the four-year curriculums offered under the Schools of Agriculture, Engineering, and Industrial Management and Textile Science. In the School of Arts and Sciences, the Bachelor of Science degree is awarded to those students completing the requirements in Applied Mathematics, Chemistry, Physics, and Pre-Medicine. The degree of Bachelor of Arts is awarded to those students who satisfactorily complete the curriculum in Arts and Sciences with a major concentration in Economics, English, History, Modern Languages, Geology, Mathematics, Natural Sciences, or Teaching Mathematics.

One hundred and forty-four semester credit hours are required for graduates in each of the four-year curriculums with the following exceptions:

—In Forestry, a forestry summer camp is required in addition to the 144-hour requirement.

—In the Bachelor of Arts program, 131 credits are required of students electing major concentrations in Economics, English, History, or Modern Languages, and 135 credits are required of majors or minors in Geology or Mathematics and majors in Natural Sciences or Teaching Mathematics.

In the School of Architecture, two five-year programs requiring 176 semester credit hours each, lead to the Bachelor of Architecture degree and the Bachelor of Building Construction degree.

In addition to the courses prescribed in the various curriculums, each student must complete the elective credits as listed in the curriculums. Students selected for advanced ROTC may substitute air or military science courses for six semester credits of these electives. For example, a student enrolled in Electrical Engineering, which normally requires 144 semester hours for graduation, who completes the full ROTC program will be required to have 150 semester credit hours for graduation. Students making satisfactory progress may expect to complete the program of work with advanced ROTC in four academic years. Others must realize that taking the full ROTC program may necessitate extending their college programs over more than eight semesters.
For graduation in the calendar year 1963, a cumulative grade-point ratio of 1.80 or above is required. In 1964, 1965, 1966, and 1967 a cumulative grade-point ratio of 1.90 will be required. Candidates for the degrees listed above are required to apply for their degrees within four weeks following the opening of the final semester or summer session prior to the date the degrees are to be awarded. These applications should be filled out in the Office of Admissions and Registration on the regular blanks provided.

All work for a degree must be completed, all financial settlements made, and all government property and library books returned by 5 p.m. on the Tuesday preceding graduation. Residence of at least the last regular session is required for graduation.

A student in line for graduation at the end of this semester who fails to graduate because of an F on one course taken this semester may stand a special examination under certain conditions on the course after the regular degree date. Similarly, a candidate who received one or more grades of E this semester may have an opportunity of removing the unsatisfactory grades after the regular degree date. A senior who qualifies for graduation under either of these provisions will be awarded his degree on the next regular date for the award of degrees. For further information see Scholastic Regulations.

A student in line for graduation at the end of a semester or summer term who meets all requirements for graduation except for a deficiency in his grade-point ratio resulting from a deficiency of not more than six grade points shall have the privilege of making up his deficiency by standing special re-examinations under certain conditions.

The examinations shall be taken after the regular degree date and in courses totaling not more than 6 semester credit hours which were passed during the last 1½ or 2 semesters of residence, and only one such examination may be taken on an individual course. When such examinations are taken under the above provision, the credit hours of the course or courses will not be counted as additional credit hours taken. Only the grade points over and above the grade points previously earned in the course may count toward raising the grade-point ratio.

A student who qualifies for graduation under this provision will be awarded his degree on the next regular date for the award of degrees.
If all work toward a degree is not completed within five years after entrance, the student may be required to take additional courses.

**GRADUATE DEGREES**

The degrees of Doctor of Philosophy, Master of Arts, Master of Science, Master of Agricultural Education, Master of Architecture, and Master of Education are awarded to those students who satisfactorily complete prescribed graduate programs.

For further information concerning advanced degrees see *The Graduate Bulletin*, which may be obtained from the Offices of Admissions and Registration or the Dean of the Graduate School.

**UNDERGRADUATE CURRICULUMS**

Thirty-two undergraduate curriculums are offered under the Schools of Agriculture, Architecture, Arts and Sciences, Engineering, and Industrial Management and Textile Science. The curriculums under each school are listed below:

<table>
<thead>
<tr>
<th>School of Agriculture</th>
<th>Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Economics</td>
<td>Physics</td>
</tr>
<tr>
<td>Agricultural Education</td>
<td>Pre-Medicine</td>
</tr>
<tr>
<td>Agricultural Engineering</td>
<td></td>
</tr>
<tr>
<td>Agronomy</td>
<td></td>
</tr>
<tr>
<td>Animal Husbandry</td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td></td>
</tr>
<tr>
<td>Dairy Science</td>
<td></td>
</tr>
<tr>
<td>Entomology</td>
<td></td>
</tr>
<tr>
<td>Food Technology</td>
<td></td>
</tr>
<tr>
<td>Forestry</td>
<td></td>
</tr>
<tr>
<td>Horticulture</td>
<td></td>
</tr>
<tr>
<td>Poultry Science</td>
<td></td>
</tr>
<tr>
<td>Pre-Veterinary</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School of Architecture</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td></td>
</tr>
<tr>
<td>Building Construction</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School of Arts and Sciences</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Mathematics</td>
<td></td>
</tr>
<tr>
<td>Arts and Sciences</td>
<td></td>
</tr>
</tbody>
</table>

In the curriculums which follow are given the official title and number of the course, the descriptive title, the number of semester

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* Jointly administered by the School of Agriculture and the School of Engineering.

** Pre-Dental students take a modified Pre-Medicine curriculum.
hours credit, and in parentheses the number of hours per week in class and laboratory, respectively.

SCHOOL OF AGRICULTURE

The advance of science and technology has transformed agriculture from what was basically farming into an extremely complex industry. Today the broad field of agriculture includes, in addition to farm production, the processing and distributing of farm products and the providing of supplies and services for the farmer. It has been estimated that these three segments together employ some 26 million people in the United States, thus accounting for 40 per cent of all jobs. In addition, a half million scientists directly or indirectly serve agriculture.

There are more than 500 types of occupations available to college agricultural graduates. Our land-grant colleges, such as Clemson, are graduating about 7,000 students each year in agriculture—less than one-half of the number needed.

The School of Agriculture is composed of three main divisions: Resident Teaching, Research (Agricultural Experiment Station), and Extension (Agricultural Extension Service). Organized under the Division of Resident Teaching are curriculums in Agricultural Economics, Agricultural Education, Agricultural Engineering,* Agronomy, Animal Husbandry, Biology, Dairy Science, Entomology, Food Technology, Forestry, Horticulture, Poultry Science, and Pre-Veterinary Medicine. In order to provide the best possible education for current and future needs in the rapidly changing field of agriculture, the School of Agriculture at Clemson recently made significant changes in the fields of instruction. Among the major changes is the provision in several curriculums for a student to choose from the options in Science, Business and Production Technology.

Science Option—This option emphasizes the basic sciences that prepare students to contribute to the advancement of knowledge in their respective fields. It is designed for students whose anticipated field of work requires considerable scientific training, usually including graduate studies. Employment opportunities include research with State Agricultural Experiment Stations, the United States Department of Agriculture, and industrial and commercial organizations; and teaching in colleges of agriculture, and other educational work with Federal, State and industrial organizations.

* Jointly administered by the School of Agriculture and the School of Engineering.
Business Option—This option emphasizes principles and practices of business management as applied to businesses and industries associated with agriculture. It is designed for students who plan to work with one of the many businesses and industries that provide supplies and services for the farmer, and process and distribute farm products. Employment opportunities include work related to meat and poultry processing, sales and service of farm machinery, manufacturing and sales of fertilizers and pesticides, dairy and food processing, grain and seed processing, feed manufacturing, banking and credit, insurance, farm management, land appraising, and the marketing of agricultural commodities.

Production Technology Option—This option emphasizes the application of scientific principles to agricultural production. It is designed for students whose anticipated field of work requires broad general training in scientific and practical agriculture. Employment opportunities include general and specialized farming; agricultural extension services; teaching vocational agriculture; conservation of natural resources; agricultural communication; and agricultural services of the United States Department of Agriculture, State Departments of Agriculture, and private enterprises.

To further illustrate the types of work in which graduates engage, a few of the many occupations of agricultural graduates are listed under each curriculum.

BASIC CURRICULUM
Required of all students planning to major in Agricultural Economics, Agricultural Education, Agronomy, Animal Husbandry, Dairy Science, Entomology, Horticulture or Poultry Science

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Second Semester *</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester †</strong></td>
</tr>
<tr>
<td>Agr 101 Introd. to Agriculture</td>
<td>Agron 102 Crop Science</td>
</tr>
<tr>
<td>Bot 101 Gen. Botany</td>
<td>AH 102 Animal Science</td>
</tr>
<tr>
<td>Ch 101 Gen. Chemistry</td>
<td>AH 104 Animal Science Lab</td>
</tr>
<tr>
<td>Engl 101 English Composition</td>
<td>Ch 102 Gen. Chemistry</td>
</tr>
<tr>
<td>Math 105 Alg. and Trig.</td>
<td>Engl 102 English Composition</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>Zool 101 Gen. Zoology</td>
</tr>
<tr>
<td><strong>17</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

* Students planning to major in Ornamental Horticulture may substitute EG 101 and CE 200 for AH 102 and 104.
† Students planning to choose the Science Option should schedule Math 106 in the second semester of the freshman year.
AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

Currently the curriculum in Agricultural Economics and Rural Sociology provides for two options—Science and Business. In general the Business option is the equivalent of a major in Agricultural Business Administration with a strong background in agricultural and biological science. Those who select this option would not normally expect to pursue their formal training much beyond the bachelor’s degree. The Science option on the other hand has been designed primarily for those who expect to become professional agricultural economists or rural sociologists and whose plans for education would likely include some work at the graduate level.

Employment opportunities open to graduates with degrees in Agricultural Economics are many. They include research and teaching in institutions of higher learning; sales and promotional work for a variety of businesses; management positions in the farm loan departments of private banks or with cooperative farm credit agencies; public relations activities for various firms; market managers and directors; county agents; representatives of government agencies serving agriculture; and operators of numerous enterprises.

AGRICULTURAL ECONOMICS MAJOR

(See page 108 for Freshman Year)

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Junior Year</th>
<th>Senior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Semester</td>
<td>Second Semester</td>
<td>Approved Electives*</td>
</tr>
<tr>
<td>Acct 201 Prin. of Accounting ....</td>
<td>3 (3.0)</td>
<td>Ag Ec 202 Agric. Economics ....</td>
</tr>
<tr>
<td>Agron 202 Soils ...............</td>
<td>3 (2.3)</td>
<td>Econ 202 Principles of Econ. ....</td>
</tr>
<tr>
<td>Econ 201 Principles of Econ. ....</td>
<td>3 (3.0)</td>
<td>Engl 204 Survey of Engl. and ..</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit. ....</td>
<td>3 (3.0)</td>
<td>Amer. Lit. .................</td>
</tr>
<tr>
<td>AS or MS—Basic ..................</td>
<td>1 (2.1)</td>
<td>Phys 201 Gen. Physics ..........</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Phys 203 Gen. Physics Lab. .. 1 (0.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AS or MS—Basic .......... 1 (2.1)</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Of the 22 hours of approved electives a minimum of 9 hours must be taken in other departments in the School of Agriculture.

† To be selected from the following courses: Econ 314, Econ 403, Econ 404, Econ 406, Econ 407, Econ 412, Econ 416, For 304, Hist 406, IM 404.
### AGRICULTURAL EDUCATION

This curriculum, organized within the framework of the Production Technology option, is designed primarily for students who wish to prepare for positions in vocational agriculture. It is also appropriate for those who plan to engage in other forms of rural educational work, such as agricultural missionary, public relations, and agricultural extension. In addition many graduates enter farming, soil conservation and other governmental work whereas others are employed in business and industry.

The curriculum provides for a broad training in agriculture as well as general and professional education, including student teaching.

### AGRICULTURAL EDUCATION MAJOR

(See page 108 for Freshman Year)
**AGRONOMY**

The curriculum in Agronomy deals with crop and soil science. Trained agronomists may choose their life work from many different fields that relate to soils and crops. The work they choose may range from the highly applied (farming) to the highly abstract (basic research). Between these extremes are the college and high school teaching, the extension service, and soil conservation work. Fertilizer companies and manufacturers of weed control chemicals conduct research, sales, and technical services that employ agronomists. Large seed companies are looking for plant breeders and other men trained in agronomy to direct their production programs. Recently, opportunities have intensified for soil scientists to make land appraisals for tax commissions and others. Agronomists hold many important administrative positions. Some are doing technical work with Foundations in Asia and South America.

Options may be chosen in either Science, Business or Production Technology.

**AGRONOMY MAJOR**

(See page 105 for Freshman Year)

**SCIENCE OPTION**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sophomore Year</strong></td>
<td></td>
</tr>
<tr>
<td>Ch 323 Org. Chem.</td>
<td>Agron 202 Soils</td>
</tr>
<tr>
<td>Phys 201 Gen. Physics</td>
<td>Amer. Lit.</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>Phys 202 Gen. Physics</td>
</tr>
<tr>
<td></td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td><strong>Junior Year</strong></td>
<td></td>
</tr>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>AgE 301 Soil Conservation</td>
<td>Ag Ec 452 Agric. Policy</td>
</tr>
<tr>
<td>Dy Sc 201 Introd. Dairying</td>
<td>AH 301 Feeds and Feeding</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
<td>Ed 302 Educ. Psychology</td>
</tr>
<tr>
<td>Gov 301 Am. Gov. and Pol. Far.</td>
<td>For 307 Farm Forestry</td>
</tr>
<tr>
<td>Hort 464 Food Preservation*</td>
<td>RS 301 Rural Sociology</td>
</tr>
<tr>
<td>Approved Elective</td>
<td>Approved Elective</td>
</tr>
<tr>
<td><strong>Senior Year</strong></td>
<td></td>
</tr>
<tr>
<td>Ag Ec 302 Farm Management</td>
<td>Ag Ed 401 Methods in Ag, Educ.</td>
</tr>
<tr>
<td>Agron 301 Fertilizers</td>
<td>Ag Ed 406 Directed Teaching</td>
</tr>
<tr>
<td>Bot 401 Plant Pathology</td>
<td>Ag Ed 452 Prob. in Adult Educ.</td>
</tr>
<tr>
<td>Hort 407 Landscape Design</td>
<td>Music 310 Music Appreciation</td>
</tr>
<tr>
<td>Approved Elective</td>
<td></td>
</tr>
</tbody>
</table>

* Hort 302 or 305 or 352 or 451 or 456 may be substituted upon approval of the class adviser.
### Degrees and Curriculums

#### First Semester
- Agron 302 Genetics
- Bact 301 Gen. Bacteriology
- Econ 201 Principles of Econ.
- Social Science Elective

#### Junior Year
- Bot 352 Plant Physiology
- Engl 301 Public Speaking
- Approved Electives

#### Second Semester
- Bot 352 Plant Physiology
- Engl 301 Public Speaking
- Approved Electives

#### Senior Year
- Agron 455 Seminar
- Bot 401 Plant Pathology
- Ex St 401 Intro. Statistics
- Approved Electives

#### Business Option

#### Sophomore Year
- Econ 201 Principles of Econ.
- IM 201 Introdt. to Ind. Mgt.
- Hort Elective
- AS or MS—Basic

#### Junior Year
- Agron 301 Fertilizers
- Agron 302 Genetics
- Bact 301 Gen. Bacteriology
- Engl 301 Public Speaking
- Social Science Elective
- Approved Electives

#### Senior Year
- Agron 403 Soil Classification
- Agron 407 Prin. of Weed Control
- Agron 409 Cotton & Tobacco
- Agron 455 Seminar
- Bot 401 Plant Pathology
- Approved Electives

---

*To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.

† At least nine credits must be taken from the following courses: Agron 301, Agron 306, Agron 308, Agron 401, Agron 403, Agron 407, Agron 409, Agron 452, Hort 468.

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### Production Technology Option

#### Sophomore Year
- Econ 201 Principles of Econ.
- Phys 201 Gen. Physics
- AS or MS—Basic
- Approved Elective

#### Second Semester
- Ag Ec 309 Introd. to Marketing
- Agron 306 Forage & Pasture Crops
- Bot 352 Plant Physiology
- Approved Electives

---

*To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.

† At least three of the following courses must be completed: Ag Ec 352, Ag Ec 456, Ag Ec 460, Dy Sc 351, Econ 302, Econ 312, IM 302, IM 307.
Animal Husbandry

The Animal Husbandry Department emphasizes subject matter dealing with the application of scientific principles to livestock production and processing.

Occupations for Animal Husbandry graduates include livestock farming; cattle, swine and sheep breeding; extension livestock specialists; feed specialists; county agents; teaching and research in animal industry; positions with meat packing companies; feed dealers; freezer locker operators; livestock dealers; and livestock commission brokers.

The Animal Husbandry Department offers options in Science, Business and Production Technology.

### ANIMAL HUSBANDRY MAJOR
(See page 108 for Freshman Year)

#### SCIENCE OPTION

<table>
<thead>
<tr>
<th>Junior Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>Ag Ec 302 Farm Management</td>
<td>Agron 302 Genetics</td>
</tr>
<tr>
<td>AgE 301 Soil Conservation</td>
<td>Agron 306 Forage &amp; Pasture Crops</td>
</tr>
<tr>
<td>Bact 301 Gen. Bacteriology</td>
<td>Bot 352 Plant Physiology</td>
</tr>
<tr>
<td>Ent 301 Elem. and Econ. Ent.</td>
<td>Engl 301 Public Speaking</td>
</tr>
<tr>
<td>Social Science Elective*</td>
<td>Approved Elective</td>
</tr>
<tr>
<td><strong>19</strong></td>
<td><strong>19</strong></td>
</tr>
<tr>
<td><strong>Senior Year</strong></td>
<td></td>
</tr>
<tr>
<td>Agron 401 Adv. Crop &amp; Seed Lab</td>
<td>Agron 405 Plant Breeding</td>
</tr>
<tr>
<td>Agron 403 Soil Classification</td>
<td>Agron 452 Soil Fert. and Mgt.</td>
</tr>
<tr>
<td>Agron 407 Prin. of Weed Control</td>
<td>Agron 456 Seminar</td>
</tr>
<tr>
<td>Agron 455 Seminar</td>
<td>Hort 468 Intro. to Research</td>
</tr>
<tr>
<td>Bot 401 Plant Pathology</td>
<td>Approved Electives</td>
</tr>
<tr>
<td>Approved Electives</td>
<td><strong>6</strong></td>
</tr>
<tr>
<td><strong>17</strong></td>
<td></td>
</tr>
</tbody>
</table>

* To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.

### ANIMAL HUSBANDRY MAJOR

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>Ch 323 Org. Chem.</td>
<td>Agron 202 Soils</td>
</tr>
<tr>
<td>Ch 327 Org. Chem. Lab.</td>
<td>Econ 201 Principles of Econ.</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td><strong>16</strong></td>
<td><strong>18 or 19</strong></td>
</tr>
</tbody>
</table>

* Ch 310, Ch 316, or Ch 324 and Ch 328.
<table>
<thead>
<tr>
<th></th>
<th>First Semester</th>
<th></th>
<th>Junior Year</th>
<th></th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>AH 301 Feeds and Feeding</td>
<td>3 (3.0)</td>
<td></td>
<td>Agron 302 Genetics</td>
<td>3 (2.3)</td>
<td></td>
</tr>
<tr>
<td>AH 303 Feeds and Feeding Lab.</td>
<td>1 (0.5)</td>
<td></td>
<td>AH 306 Judging</td>
<td>2 (1.3)</td>
<td></td>
</tr>
<tr>
<td>AH 353 Meats</td>
<td>1 (1.0)</td>
<td></td>
<td>Bact 301 Gen. Bacteriology</td>
<td>4 (3.3)</td>
<td></td>
</tr>
<tr>
<td>AH 355 Meats Lab.</td>
<td>2 (0.6)</td>
<td></td>
<td>Engl 301 Public Speaking</td>
<td>3 (3.0)</td>
<td></td>
</tr>
<tr>
<td>Zool 307 Animal Anat. and Phys.</td>
<td>3 (2.3)</td>
<td></td>
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<td>Ex St 401 Intro. Statistics</td>
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<td>AH 452 Animal Breeding</td>
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† To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.

‡ Two of the following courses must be completed. AH 401, AH 407, or AH 408. One of the following lab courses must also be completed: AH 403, 409, or AH 410. The lab taken must correspond to one of the theory courses selected.

**BUSINESS OPTION**

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* Two of the following courses must be completed: AH 401, AH 407, or AH 408. The Lab courses corresponding to the theory courses must also be completed.

‡ At least three of the following courses must be completed: Agron 301, AH 305, Bact 401, DySc 403, DySc 452, Hort 464, PS 352, PS 355, PS 458.

† To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, or Soc 301.

**PRODUCTION TECHNOLOGY OPTION**

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Dairy Science

Junior Year

**First Semester**

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<th>Course</th>
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<td>AH 301 Feeds and Feeding</td>
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<tr>
<td>AH 353 Meats</td>
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<td>AH 355 Meats Lab.</td>
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<td>Gov 301 Am. Gov. and Pol. Par.</td>
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**Second Semester**

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<td>Aaron 302 Genetics</td>
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<td>AH 306 Judging</td>
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<td>Bact 301 Gen. Bacteriology</td>
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<td>Engl 301 Public Speaking</td>
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**Approved Elective** 19

**Senior Year**

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<tr>
<td>AH 401 Beef Production</td>
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<td>AH 407 Horse &amp; Sheep Prod.</td>
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<td>AH 409 Horse &amp; Sheep Prod. Lab.</td>
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<td>Dy Sc 453 Reprod. of Farm Anim.</td>
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<td>Ent 301 Elem. and Econ. Ent.</td>
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</table>

**Approved Elective** 18

*To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, Rs 301, Soc 301.

DAIRY SCIENCE

Selected studies of fundamental and technical nature, superimposed upon the required basic science core of the Dairy Science curriculum, enable students to acquire the perspective, understanding, and proficiency necessary to enter a demanding, rewarding, and respected industry. The production and processing areas in the Dairy Science curriculum emphasize understanding based on scientific principles, explaining why the tenets are true. Somewhat less emphasis is given to phases of technology concerned with how to do things, but these areas are given good coverage.

Required and suggested studies in Arts and Sciences plus courses selected by the student in areas of personal interest complete the educational program designed to fit the graduate for his total lifework.

Occupational opportunities for dairy science graduates include management of production and processing facilities, teaching research, and extension work, quality control work for processing units and production organizations, public health service, industrial promotion and public relations work in both production and processing fields, dairy and food products engineering, special services, and educational work in non-institutional fields. Special service opportunities are available in areas of state and national breed association work, breeding organizations, industrial supplies, production and processing equipment and supplies. Opportunities in educational activities not connected with schools and colleges include positions with industrial associations, state and federal services, and federal programs with foreign assignments.
The Dairy Science curriculum has three self-contained options—Science, Business, and Production Technology.

### DAIRY SCIENCE MAJOR
(See page 108 for Freshman Year)

#### SCIENCE OPTION

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<td>Ch 327 Org. Chem. Lab.</td>
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<td>Dy Sc 307 Market Milk*</td>
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<td>Engl 301 Public Speaking</td>
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<td>Dy Sc 403 Animal Nutrition</td>
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<tr>
<td>Dy Sc 405 Dairy Manufactures*</td>
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<tr>
<td>or Dy Sc 453 Reprod. of Farm Animals†</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Dy Sc 409 Dairy Seminar</td>
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<tr>
<td>Zool 307 Animal Anat. &amp; Phys.</td>
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### BUSINESS OPTION

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† At least three of the following courses must be completed: Ag Ec 352, Ag Ec 456, Ag Ec 460, Dy Sc 351, Econ 302, Econ 312, IM 302, IM 307.
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<tr>
<th>First Semester</th>
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<tr>
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<td>Agron 302 Genetics</td>
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<td>Dy Sc 307 Market Milk*</td>
<td>3 (2,3)</td>
<td>AH 301 Feeds and Feeding</td>
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<td>Engl 301 Public Speaking</td>
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**Senior Year**

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<td>Dy Sc 403 Animal Nutrition</td>
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<tr>
<td>Dy Sc 405 Dairy Manufactures*</td>
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<td>or Dy Sc 453 Reprod. of Farm Animals†</td>
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* Taught only in academic years ending in even number (example 1963-1964).
† Taught only in academic years ending with odd number (example 1964-1965).
§ At least three of the following courses must be completed: Ag Ec 352, Ag Ec 456, Ag Ec 460, Dy Sc 351, Econ 302, Econ 312, IM 302, IM 307.

**Production Technology Option**

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<td>First Semester</td>
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</table>

* Taught only in academic years ending in even number (example 1963-1964).
† Taught only in academic years ending with odd number (example 1964-1965).
§ To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.
ENTOMOLOGY

Entomology is that branch of science that deals with the study of insects. In many ways insects are the most important group of animals that affect man. At the present time insects are costing the American public approximately four billion dollars annually. There will always be a need for qualified entomologists and the financial rewards to members of this profession are comparable to those enjoyed by most other scientists.

Two options are available in the Entomology curriculum—Science and Business. Depending on training, ability, and interest, entomologists find employment in such areas as the following: (1) research entomologists with several federal agencies, the state experiment stations, or private research foundations; (2) teaching entomology and/or zoology at the college or university level; (3) industrial research and the development of more efficient insecticides; (4) quarantine and regulatory work at both state and federal levels; (5) sales and management for agricultural chemical or the pest control industries; (6) the federal and state extension services; (7) many other specialized areas where a knowledge of insects is essential, such as beekeeping or disease transmission.

ENTOMOLOGY MAJOR
(See page 108 for Freshman Year)

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<td>Zool 307 Animal Anat. &amp; Physiol.</td>
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<tr>
<td>Approved Electives§</td>
</tr>
<tr>
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<table>
<thead>
<tr>
<th>Senior Year</th>
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<tbody>
<tr>
<td>Bot 401 Plant Pathology</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
</tr>
<tr>
<td>Ent 405 Insect Morph.</td>
</tr>
<tr>
<td>Ent 461 Seminar†</td>
</tr>
<tr>
<td>Ex St 401 Introd. Statistics</td>
</tr>
<tr>
<td>Approved Electives§</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

* To be taught in 1963-1964 and alternate years thereafter.
† To be taught in 1962-1963 and alternate years thereafter.
‡ To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.
§ At least three of the following courses must be completed: Ag Ec 332, Ag Ec 456, Ag Ec 460, Dy Sc 351, Econ 302, Econ 312, IM 302, IM 307.
**Horticulture (Fruit and Vegetables)**

This curriculum provides the student with a basic education in science and the humanities, and the application of both in the scientific, technical, and business phases of the fruit and vegetable industry.

Opportunities in this field of study include vegetable and fruit farm management; inspection of fresh fruit, vegetable and other food products as well as nursery stock. There are many other opportunities as in plant breeding, agricultural extension service work, horticultural research, horticultural teaching and writing, and fruit and vegetable processing. Other occupations include sales and field work with seedsmen and nurserymen, and manufacturers of food fertilizer, and pesticide products.

Students majoring in the fruit and vegetable phase of Horticulture may choose from the Science, Business, or Production Technology options.

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### BUSINESS OPTION

#### Sophomore Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
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<tbody>
<tr>
<td>Agron 202 Soils</td>
<td>201 Prim. of Accounting</td>
</tr>
<tr>
<td>Ch 220 Elem. Org. Chem.</td>
<td>202 Agric. Economics</td>
</tr>
<tr>
<td>Econ 201 Principles of Econ.</td>
<td>204 Survey of Engl. and</td>
</tr>
<tr>
<td>IM 201 Introd. to Ind. Mgt.</td>
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</tr>
<tr>
<td>AS or MS—Basic</td>
<td>203 Gen. Physics Lab.</td>
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#### Junior Year

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Ag Ec 309 Introd. to Marketing</td>
<td>301 Gen. Bacteriology</td>
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<tr>
<td>Agron 302 Genetics</td>
<td>301 Public Speaking</td>
</tr>
<tr>
<td>Dy Sc 351 Advertising and Merch.</td>
<td>306 Econ. Entomology</td>
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<td>Ent 305 Econ. Entomology</td>
<td>301 Am. Gov. and Pol. Par.</td>
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#### Senior Year

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<th>Second Semester</th>
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<tr>
<td>Bot 401 Plant Pathology</td>
<td>408 Gen. &amp; Tax. Ent. †</td>
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<td>Econ 312 Commercial Law</td>
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<td>Ent 461 Seminar †</td>
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<td>Social Science Elective †</td>
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</tbody>
</table>

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* To be taught in 1963-1964 and alternate years thereafter.  
† To be taught in 1962-1963 and alternate years thereafter.  
‡ To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.
## HORTICULTURE (FRUIT AND VEGETABLE) MAJOR

*(See page 108 for Freshman Year)*

### SCIENCE OPTION

#### Sophomore Year

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<th>First Semester</th>
<th>Second Semester</th>
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<td>Agron 202 Soils</td>
<td>Ch 316 Quan. Analysis</td>
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<tr>
<td>Ch 323 Org. Chem.</td>
<td>or Ch 324 Org. Chem.</td>
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<td>AS or MS—Basic</td>
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#### Junior Year

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<th>Second Semester</th>
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<td>Bot 352 Plant Physiology</td>
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#### Senior Year

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<th>Second Semester</th>
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<tr>
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<td>Ex St 401 Introd. Statistics</td>
<td>Hort 410 Seminar</td>
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<tr>
<td>Hort 407 Landscape Design</td>
<td>Hort 468 Introd. to Research</td>
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<tr>
<td>Hort 409 Seminar</td>
<td>Approved Elective</td>
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<tr>
<td>Hort 464 Food Preservation</td>
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## BUSINESS OPTION

### Sophomore Year

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<th>Second Semester</th>
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<tr>
<td>Agron 202 Soils</td>
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<td>Ag Ec 202 Agric. Economics</td>
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<td>Econ 201 Principles of Econ.</td>
<td>Engl 204 Survey of Engl. and</td>
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<td>IM 201 Introd. to Ind. Mgt.</td>
<td>Hort 201 Gen. Horticulture</td>
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<td>AS or MS—Basic</td>
<td>Phys 201 Gen. Physics</td>
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#### Junior Year

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<tbody>
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<td>Agron 302 Genetics</td>
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<td>Engl 301 Public Speaking</td>
<td>Bot 352 Plant Physiology</td>
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<td>Hort 305 Plant Propagation</td>
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<td>Hort 352 Commercial Pomology</td>
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#### Senior Year

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<tbody>
<tr>
<td>Hort 407 Landscape Design</td>
<td>Bot 401 Plant Pathology</td>
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<tr>
<td>Hort 409 Seminar</td>
<td>Hort 410 Seminar</td>
</tr>
<tr>
<td>Hort 464 Food Preservation</td>
<td>Approved Electives†</td>
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*To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.

†At least two of the following courses must be selected: Ag Ec 352, Ag Ec 456, Ag Ec 460, Econ 302, Econ 312, IM 302, IM 307.
Horticulture (Ornamental) 121

PRODUCTION TECHNOLOGY OPTION

SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tr>
<td>Agro 202 Soils</td>
<td>Ag Ec 202 Agric. Economics</td>
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<tr>
<td>Ch 220 Elem. Org. Chem.</td>
<td>Ag Ec 206 Agric. Mechanization</td>
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<td>Econ 201 Principles of Econ.</td>
<td>Engl 204 Survey of Engl. and</td>
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<tr>
<td>Hort 201 Gen. Horticulture</td>
<td>Ent 301 Elem. and Econ. Ent.</td>
</tr>
<tr>
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<td>Phys 201 Gen. Physics</td>
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JUNIOR YEAR

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<tr>
<td>Bact 301 Gen. Bacteriology</td>
<td>Ag Ec 302 Farm Management</td>
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<td>Engl 301 Public Speaking</td>
<td>Agro 302 Genetics</td>
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<td>Gov 301 Am. Gov. and Pol. Par.</td>
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<tr>
<td>Hort 305 Plant Propagation</td>
<td>Social Science Elective*</td>
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<tr>
<td>Hort 352 Commercial Pomology</td>
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SENIOR YEAR

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<tr>
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<th>Second Semester</th>
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<tr>
<td>Bus 401 Plant Pathology</td>
<td>Agro 465 Plant Breeding</td>
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<tr>
<td>Hort 409 Seminar</td>
<td>Hort 308 Landscape Design</td>
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<tr>
<td>Hort 464 Food Preservation</td>
<td>Hort 410 Seminar</td>
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<td>Approved Electives</td>
<td>Hort 451 Small Fruit Culture</td>
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<td>Hort 456 Truck Crops</td>
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</tbody>
</table>

*To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.

HORTICULTURE (Ornamental)

This curriculum is designed to give students a scientific background and technical facilities in the field of Ornamental Horticulture. Subject matter covers plant materials culture, uses, and planning of ground spaces.

Graduates find careers in nursery work, floriculture, landscape designing, landscape contracting, turf management, and park supervision. Other occupations are as research personnel, teachers, extension workers, and as representatives of fertilizer, machinery, and chemical companies.

Students desiring to major in Ornamental Horticulture may choose from the Science, Business, or Production Technology options.

HORTICULTURE (ORNAMENTAL) MAJOR

(See page 108 for Freshman Year)

SCIENCE OPTION

SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>Agro 202 Soils</td>
<td>Ch 316 Quan. Analysis</td>
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<td>or Ch 324 Org. Chem.</td>
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<td>Amer. Lit.</td>
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<td>AS or MS—Basic</td>
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### Degrees and Curriculums

#### BUSINESS OPTION

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<th>Junior Year</th>
<th>Second Semester</th>
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<tr>
<td>Agron 302 Genetics</td>
<td>3 (2,3)</td>
<td>Bot 332 Plant Physiology</td>
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<td>Engl 301 Public Speaking</td>
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<td>Gov 301 Am. Gov. and Pol. Pol.</td>
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<td>Ent 301 Elem. and Econ. Ent.</td>
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<td>Hort 302 Prin. Veg. Prod.</td>
<td>3 (2,3)</td>
<td>Hort 304 Plant Materials II</td>
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<tr>
<td>Hort 303 Plant Materials I</td>
<td>3 (2,3)</td>
<td>Hort 308 Landscape Design</td>
</tr>
<tr>
<td>Hort 305 Plant Propagation</td>
<td>3 (2,3)</td>
<td>Hort 310 Floriculture</td>
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<thead>
<tr>
<th>Senior Year</th>
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<tbody>
<tr>
<td>Bot 401 Plant Pathology</td>
<td>3 (2,3)</td>
<td>Bot 336 Taxonomy</td>
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<tr>
<td>Hort 352 Commercial Pomology</td>
<td>3 (2,3)</td>
<td>Ex St 401 Introd. Statistics</td>
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<tr>
<td>Hort 409 Seminar</td>
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<td>Approved Electives</td>
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<td>Hort 468 Introd. to Research</td>
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<td>Social Science Elective&lt;sup&gt;*&lt;/sup&gt;</td>
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<sup>*</sup> To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.

### PRODUCTION TECHNOLOGY OPTION

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<th>Second Semester</th>
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<tr>
<td>Agron 302 Genetics</td>
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<td>Ag Ec 202 Agric. Economics</td>
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<td>Bact 301 Gen. Bacteriology</td>
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<td>Ag Ec 309 Introd. to Marketing</td>
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<td>Gov 301 Am. Gov. and Pol. Pol.</td>
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<td>Hort 304 Plant Materials II</td>
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<td>Hort 305 Plant Propagation</td>
<td>3 (2,3)</td>
<td>Hort 308 Landscape Design</td>
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<td>Hort 310 Floriculture</td>
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<tr>
<td>Bot 401 Plant Pathology</td>
<td>3 (2,3)</td>
<td>Hort 406 Nursery Technology</td>
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<td>Hort 409 Seminar</td>
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<td>Approved Electives†</td>
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<td>Social Science Elective&lt;sup&gt;*&lt;/sup&gt;</td>
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<sup>*</sup> To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.

† At least two of the following courses must be selected: Ag Ec 352, Ag Ec 456, Ag Ec 460, Econ 302, Econ 312, IM 302, IM 307.
### Junior Year

<table>
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<tr>
<td>Agron 302 Genetics</td>
<td>Ag Ec 302 Farm Management</td>
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<td>Bact 301 Gen. Bacteriology</td>
<td>Bot 352 Plant Physiology</td>
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<td>Gov 301 Am. Gov. and Pol. Par.</td>
<td>Engl 301 Public Speaking</td>
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<tr>
<td>Hort 303 Plant Materials I</td>
<td>Hort 304 Plant Materials II</td>
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<td>Hort 305 Plant Propagation</td>
<td>Hort 308 Landscape Design</td>
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<tr>
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<td>Hort 310 Floriculture</td>
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### Senior Year

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Bot 401 Plant Pathology</td>
<td>Agron 405 Plant Breeding</td>
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<tr>
<td>Hort 409 Seminar</td>
<td>Hort 406 Nursery Technology</td>
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<tr>
<td>Hort 412 Turf Management</td>
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<td>Hort 460 Adv. Landscape Design</td>
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<td><strong>18</strong></td>
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</tbody>
</table>

*To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.

### Poultry Science

The Poultry Science curriculum is designed to provide sound training in the basic disciplines within which the poultry industry operates. Technical poultry courses emphasize the application of basic principles to production, processing and marketing of poultry products. The curriculum is sufficiently flexible to permit a degree of specialization in the areas of pathology, nutrition, physiology, genetics, management or processing.

Graduates of the Poultry Science curriculum find employment as sales and servicemen with feed, drug and equipment manufacturers, extension agents and specialists, hatchery managers and poultry farm operators. The increased use of the chick as an experimental animal provides positions for graduates as researchers with pharmaceutical houses, chemical manufacturers, private laboratories, government research organizations, colleges and experiment stations. A strong research program conducted by the department provides opportunity for student participation in this challenging area. Many research and technical positions require training at the graduate level.

The growing size and increasing complexity of poultry industry organization has created a need for Poultry Science majors with training in business and communications.

A student may elect the Science, Business or Production Technology option.
### POULTRY SCIENCE MAJOR

(See page 108 for Freshman Year)

#### SCIENCE OPTION

##### SOPHOMORE YEAR

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<tr>
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<tr>
<td>Phys 201 Gen. Physics</td>
<td>Amer. Lit.</td>
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<td>PS 201 Introd. to Poultry Sc.</td>
<td>Phys 202 Gen. Physics</td>
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<td>AS or MS—Basic</td>
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#### JUNIOR YEAR

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<thead>
<tr>
<th>Subjects</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AH 301 Feeds and Feeding</td>
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<td>Bact 301 Gen. Bacteriology</td>
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<tr>
<td>Ch 316 Quan. Analysis</td>
<td>3</td>
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<tr>
<td>or Math 205 Anal. Geom., Cal. II</td>
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<tr>
<td>PS 355 Poultry Grad. &amp; Proc.</td>
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#### SENIOR YEAR

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<td>or Ent 455 Med. &amp; Vet. Ent.</td>
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<td>or Zool 301 Compar. Vert. Anat.</td>
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<tr>
<td>or Zool 405 Animal Histology</td>
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<td>Dy Sc 403 Animal Nutrition</td>
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<td>PS 457 Incubat. &amp; Brooding</td>
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<td>Modern Language§</td>
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<tr>
<td>Approved Electives</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td><strong>19 or 18</strong></td>
</tr>
</tbody>
</table>

* To be taught in 1963-1964 and alternate years thereafter.
† To be taught in 1962-1963 and alternate years thereafter.
‡ To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.
§ Two semesters of same language selected from French, German, Russian, or Spanish.

### BUSINESS OPTION

##### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agron 202 Soils</td>
<td>Acct 201 Prin. of Accounting</td>
</tr>
<tr>
<td>Ch 220 Elem. Org. Chem.</td>
<td>Ag Ec 202 Agric. Economics</td>
</tr>
<tr>
<td>Econ 201 Principles of Econ.</td>
<td>AH 301 Feeds and Feeding</td>
</tr>
<tr>
<td>IM 201 Introd. to Indus. Mgt.</td>
<td>Engl 204 Survey of Engl. and</td>
</tr>
<tr>
<td>PS 201 Introd. to Poultry Sci.</td>
<td>Amer. Lit.</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>Phys 201 Gen. Physics</td>
</tr>
<tr>
<td></td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3 (2,3)</strong></td>
<td><strong>3 (3,0)</strong></td>
</tr>
<tr>
<td><strong>20</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ag Ec 309 Introd. to Marketing</td>
<td>3</td>
</tr>
<tr>
<td>Agron 302 Genetcs</td>
<td>3</td>
</tr>
<tr>
<td>Bact 301 Gen. Bacteriology</td>
<td>4</td>
</tr>
<tr>
<td>Dy Sc 201 Introd. Dairying</td>
<td>3</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>PS 355 Poultry Grad. &amp; Proc.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

* To be taught in 1963-1964 and alternate years thereafter.
† To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.
Agricultural Engineering 125

**First Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dy Sc 351 Advertising and Merch.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PS 457 Incubat. &amp; Brooding†</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>11 or 12</td>
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**Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS 458 Poultry Dis. &amp; Parasites†</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>PS 460 Seminar†</td>
<td>2 (2.0)</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>12</td>
</tr>
</tbody>
</table>

17 or 18

† To be taught in 1962-1963 and alternate years thereafter.

### PRODUCTION TECHNOLOGY OPTION

**Sophomore Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agron 202 Soils</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Ch 220 Elem. Org. Chem.</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>Econ 201 Principles of Econ.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PS 201 Introd. to Poultry Sci.</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2.1)</td>
</tr>
</tbody>
</table>

17

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agron 202 Agric. Economics</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>AgE 206 Agric. Mechanization</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Dy Sc 201 Introd. Dairying</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Engl 204 Survey of Engl. and</td>
<td></td>
</tr>
<tr>
<td>Amer. Lit.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Phys 201 Gen. Physics</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Phys 203 Gen. Physics Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2.1)</td>
</tr>
</tbody>
</table>

17

### Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agron 302 Genetics</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>AH 301 Feeds and Feeding</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>AH 303 Feeds and Feeding Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Bact 301 Gen. Bacteriology</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>PS 355 Poultry Grad. &amp; Proc.*</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Zool 307 Animal Anat. &amp; Physiol.</td>
<td>3 (2.3)</td>
</tr>
</tbody>
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20

### Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS 457 Incubat. &amp; Brooding†</td>
<td>3 (2.3)</td>
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<tr>
<td>Approved Electives</td>
<td>16</td>
</tr>
</tbody>
</table>

19

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS 458 Poultry Dis. &amp; Parasites†</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>PS 460 Seminar†</td>
<td>2 (2.0)</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>13</td>
</tr>
</tbody>
</table>

18

* To be taught in 1963-1964 and alternate years thereafter.
† To be taught in 1962-1963 and alternate years thereafter.
‡ To be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.

### AGRICULTURAL ENGINEERING *

Agricultural Engineering deals fundamentally with the application of the engineering sciences to the problems of agriculture. Agricultural engineers provide engineering services in the areas of power and machinery, soil and water conservation engineering, farm electrification, farm structures, and agricultural processing.

Opportunities in Agricultural Engineering include employment with industry as design engineers, research engineers, production engineers, and in sales and service; with state and federal agencies as teachers, research engineers, and extension engineers; as field engineers with soil conservation service, bureau of reclamation, etc.; with agricultural enterprises as managers, contractors, equipment retailers and consulting engineers. The Agricultural Engineering curriculum is accredited by the Engineers’ Council for Professional Development.

* Jointly administered by the School of Agriculture and the School of Engineering.
AGRICULTURAL ENGINEERING MAJOR

First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 101 General Chemistry</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>ECE 107 Engr. Graphics</td>
<td>2 (0,6)</td>
</tr>
<tr>
<td>ECE 101 Engr. Composition</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>IE 101 Mfg. Processes</td>
<td>2 (0,6)</td>
</tr>
<tr>
<td>or Hist 104 Western Civilization</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Math 105 Alg. &amp; Trig.</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>AS or MS—Basic.</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td></td>
<td>16 or 17</td>
</tr>
</tbody>
</table>

Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agr 101 Intro. to Agriculture</td>
<td>1 (1,0)</td>
</tr>
<tr>
<td>Ch 102 General Chemistry</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>ECE 108 Engr. Graphics</td>
<td>2 (0,6)</td>
</tr>
<tr>
<td>ECE 102 Engr. Composition</td>
<td>2 (0,6)</td>
</tr>
<tr>
<td>Hist 104 Western Civilization</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>or IE 101 Mfg. Processes</td>
<td>2 (0,6)</td>
</tr>
<tr>
<td>Math 106 Anal. Geom., Cal. I</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>AS or MS—Basic.</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td></td>
<td>18 or 17</td>
</tr>
</tbody>
</table>

Sophomore Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agr 203 Agric. Engr. Prob.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>Agr 207 Farm Mechanics</td>
<td>2 (1,3)</td>
</tr>
<tr>
<td>Bot 101 General Botany</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Math 205 Anal. Geom., Cal. II</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>Phys 211 Gen. Phys. for Engr.</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>Phys 213 Gen. Phys. Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>AS or MS—Basic.</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agr 304 Agric. Machinery</td>
<td>3 (2,3)</td>
</tr>
<tr>
<td>CE 200 Elem. Surveying</td>
<td>2 (1,3)</td>
</tr>
<tr>
<td>EE 307 Basic Elect. Engr.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>EE 309 Elect. Engr. Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>EM 303 Dynamics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>IE 201 Mfg. Processes</td>
<td>2 (1,3)</td>
</tr>
<tr>
<td>Math 306 Ord. Diff. Eqs.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>ME 302 Elem. Thermodynamics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agr 401 Soil &amp; Wat. Con. Engr.</td>
<td>3 (2,3)</td>
</tr>
<tr>
<td>Agr 409 Seminar</td>
<td>1 (1,0)</td>
</tr>
<tr>
<td>Agr 452 Farm Struct. Design</td>
<td>3 (2,3)</td>
</tr>
<tr>
<td>EM 401 Fluid Mechanics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>EM 403 Fluid Mech. Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>Zool 308 Applied Zoology</td>
<td>2 (2,0)</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

BIOLOGY

The Biology curriculum is designed to give the student fundamental training in the Biological Sciences. It is arranged to give him a broad background in the biological, physical, and social sciences and then in the junior and senior years to permit him to select an option for further study either in Botany or Zoology. The number of available elective credits is sufficient to permit a student to take work in related fields of basic science or in the various areas of applied Biology; or he may complete all requirements for certification by the State Department of Education if he wishes to teach in the secondary school system.

The Biology curriculum is designed to train students to teach biology in secondary schools or for employment as applied biologists in sales, service, or research in industry or government service. It is also suitable as a base for those students who desire to take further work at the graduate level and thus prepare themselves to
teach or conduct independent research in the basic or applied biological sciences.

**BIOLOGY MAJOR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bot 101 Gen. Botany</td>
<td>Agr 101 Intro to Agriculture</td>
</tr>
<tr>
<td>Ch 101 General Chemistry</td>
<td>Ch 102 General Chemistry</td>
</tr>
<tr>
<td>EG 101 Freehand Sketching</td>
<td>Eng 102 English Composition</td>
</tr>
<tr>
<td>Math 103 Alg. &amp; Trig.</td>
<td>Zool 101 Gen. Zoology</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>Zool 103 Gen. Zoology Lab.</td>
</tr>
<tr>
<td><strong>17</strong></td>
<td><strong>1 (2.1)</strong></td>
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</table>

**Sophomore Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ 201 Principles of Econ.</td>
<td>Bot 356 Taxonomy</td>
</tr>
<tr>
<td>Eng 203 Survey of Eng. Lit.</td>
<td>Eng 204 Survey of Eng. and</td>
</tr>
<tr>
<td>Phys 201 Gen. Physics</td>
<td>Amer. Lit.</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td>Approved Elective</td>
<td>Social Science Elective*</td>
</tr>
<tr>
<td><strong>18</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

*To be selected from the following courses: Ag Ec 202, Econ 202, Gov 101, Hist 104, Rel 301, Rel 302.

**BOTANY OPTION**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bact 301 Gen. Bacteriology</td>
<td>Agr 302 Genetics</td>
</tr>
<tr>
<td>Bot 352 Plant Physiology</td>
<td>Chemistry Elective*</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
<td>Approved Electives†</td>
</tr>
<tr>
<td>Chemistry Elective*</td>
<td><strong>12 or 11</strong></td>
</tr>
<tr>
<td>Approved Electives†</td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

**Junior Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Science Elective†</td>
<td>Social Science Elective†</td>
</tr>
<tr>
<td>Approved Electives†</td>
<td>Approved Electives†</td>
</tr>
<tr>
<td><strong>18</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

* To be selected from the following courses: Ch 220, Ch 310, Ch 316, Ch 323, Ch 327, Ch 324 and 328, Ch 422 and 423. Either Ch 220 or Ch 323 and 327 must be included.


Those students who plan to teach Biology in Secondary School must take the 27 credits in Professional Education, Art and Music Appreciation, and Health required by the South Carolina State Department of Education.

1 At least 6 credits must be selected from the following courses: Ag Ec 202, Econ 202, Gov 301, Geog 301, Geog 302, Hist 301, Psych 301, Phil 301, Phil 302, RS 301, Soc 301. Within the 12 credits required in the Social Sciences at least two fields must be represented with six but not more than six semester hours in one field. The remaining six hours may be in any one or any combination of the remaining fields.
ZOOLOGY OPTION

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Junior Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 323 Org. Chem.</td>
<td>3 (3,0)</td>
<td>Bact 301 Gen. Bacteriology</td>
</tr>
<tr>
<td>Ch 327 Org. Chem. Lab.</td>
<td>1 (0,3)</td>
<td>Zool 302 Vertebrate Embryology</td>
</tr>
<tr>
<td>Ent 301 Elem. &amp; Econ. Ent.</td>
<td>3 (2,3)</td>
<td>Chemistry Elective†</td>
</tr>
<tr>
<td>Zool 307 Animal Anat. &amp; Phys.</td>
<td>3 (2,3)</td>
<td>Social Science Elective‡</td>
</tr>
<tr>
<td>Approved Electives*</td>
<td>9</td>
<td>Approved Electives*</td>
</tr>
<tr>
<td><strong>19</strong></td>
<td></td>
<td><strong>19</strong></td>
</tr>
<tr>
<td><strong>Senior Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agron 302 Genetics</td>
<td>3 (2,3)</td>
<td>Social Science Elective‡</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
<td>3 (3,0)</td>
<td>Approved Electives*</td>
</tr>
<tr>
<td>Approved Electives*</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td><strong>18</strong></td>
<td></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

* All students enrolled in the Zoology Option must select a minimum of 6 credits from the following courses: Ent 455, Zool 304, Zool 403, Zool 404, Zool 405, Zool 456, Zool 458.

† Those students who plan to teach Biology in Secondary School must take the 27 credits in Professional Education, Art and Music Appreciation, and Health required by the South Carolina State Department of Education.

‡ At least 6 credits must be selected from the following courses: Ag Ec 202, Econ 202, Geog 301, Geog 302, Gov 301, Hist 301, Psych 301, Phil 301, Phil 302, RS 301, Soc 301.

Those students who plan to teach Biology in Secondary School must take the 27 credits in Professional Education, Art and Music Appreciation, and Health required by the South Carolina State Department of Education.

FOOD TECHNOLOGY

The food processing industry is the nation’s largest industry. In addition, it is stable and ever growing. Because of these facts and because allied industries also employ food technologists, the demand for well-trained food technologists is good.

The curriculum in Food Technology provides an excellent education designed to prepare graduates for occupations in the food industry, research positions in government organizations and state experiment stations, food inspection and grading work with state and federal agencies, teaching, extension and consulting opportunities.

The student may choose either the Science or the Business option. The Science option provides an excellent basis for graduate study as well as employment. The Business option will be of particular interest to the student who wishes to combine technical and business courses with a view toward management positions in the food industry.

FOOD TECHNOLOGY MAJOR

| Freshman Year | | |
|----------------|----------------|
| First Semester | Second Semester |
| Bot 101 Gen. Botany | 4 (3,3) | Agr 101 Intro. to Agriculture | 1 (1,0) |
| Ch 101 Gen. Chemistry | 4 (3,3) | Ch 102 General Chemistry | 4 (3,3) |
| Engl 101 English Composition | 3 (3,0) | Engl 102 English Composition | 3 (3,0) |
| Math 105 Alg. & Trig. | 3 (4,0) | Math 106 Anal. Geom., Calc. I | 4 (4,0) |
| AS or MS—Basic | 1 (2,1) | Zool 101 Gen. Zoology | 3 (3,0) |
| **Total Credits:** 16 | | Zool 103 Gen. Zoology Lab. | 1 (0,3) |
| | | AS or MS—Basic | 1 (2,1) |
| | | **Total Credits:** 17 | |
### SCIENCE OPTION

#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS or MS—Basic.</td>
<td>AS or MS—Basic.</td>
</tr>
</tbody>
</table>

17

#### JUNIOR YEAR

| Bact 301 Gen. Bacteriology | Bact 312 Food Microbiology |
| Ch 331 Physical Chem. | Ch 316 Quan. Analysis |
| Econ 201 Principles of Econ. | FdT 302 Elements of Food Tech. |
| Eng 301 Public Speaking | Approved Electives* |
| FdT 301 Raw Food Mat. for Proc. | FdT 302 Elements of Food Tech. |

18

#### SENIOR YEAR

| Ex St 401 Introd. Statistics | ChE 305 Elem. of Food Proc. Engr. |
| ChE 304 Elem. of Food Proc. Engr. | FdT 404 Food Processing |
| Ch 423 Gen. Biochemistry | FdT 406 Biochem. of Nutrition |
| FdT 401 Elem. of Food Tech. | Approved Electives* |
| FdT 403 Food Processing | FdT 405 Food Analysis |
| FdT 405 Food Analysis | Approved Elective* |
| Approved Elective* | 3 |

20

*At least three elective credits must be selected from the following courses: Hist 301, Psych 301, RS 301, Soc 301.

### BUSINESS OPTION

#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 220 Elem. Org. Chem.</td>
<td>Acct 201 Prin. of Accounting</td>
</tr>
<tr>
<td>Econ 201 Principles of Econ.</td>
<td>Ag Ec 202 Agric. Economics</td>
</tr>
<tr>
<td>Eng 203 Survey of Engl. Lit.</td>
<td>Ch 316 Quan. Analysis</td>
</tr>
<tr>
<td>Phys 201 Gen. Physics</td>
<td>IM 201 Introd. to Ind. Mgt.</td>
</tr>
<tr>
<td>Phys 205 Gen. Physics Lab.</td>
<td>AS or MS—Basic.</td>
</tr>
<tr>
<td>AS or MS—Basic.</td>
<td>1 (2,1)</td>
</tr>
</tbody>
</table>

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#### JUNIOR YEAR

| Bact 301 Gen. Bacteriology | Ag Ec 309 Introd. to Marketing |
| Dy Sc 351 Advertising and Mdsgr. | Bact 312 Food Microbiology |
| Eng 301 Public Speaking | Ch 310 Agric. Biochemistry |
| Approved Electives* | FdT 302 Elem. of Food Tech. |
| Approved Electives* | Approved Electives* |

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#### SENIOR YEAR

| Ex St 401 Introd. Statistics | FdT 404 Food Processing |
| FdT 401 Elem. of Food Tech. | FdT 406 Biochem. of Nutrition |
| FdT 403 Food Processing | Gov 301 Am. Gov. and Pol. Par. |
| FdT 405 Food Analysis | Approved Electives* |
| Approved Electives* | 9 |

19

*At least three elective credits must be selected from the following courses: Hist 301, Psych 301, RS 301, Soc 301. Two of the following courses must be completed: Ag Ec 352, Ag Ec 456, Ag Ec 460, Econ 302, Econ 312, IM 302, IM 307.


FORESTRY

The Clemson Forestry curriculum includes the fundamental and applied sciences needed in the scientific management of multiple-use forests. Foresters of professional standing are employed in various capacities by private concerns or by federal, state, and other public agencies. They may be engaged as managers and administrators of forest lands, technical specialists in extension, fire protection, recreation, or in other activities presupposing professional forestry knowledge. Foresters earning advanced degrees find employment in academic work and in research conducted both by public and private agencies.

FORESTRY MAJOR

### Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bot 101 Gen. Botany</td>
<td>Agr 101 Introd. to Agriculture</td>
</tr>
<tr>
<td>Ch 101 Gen. Chemistry</td>
<td>Ch 102 General Chemistry</td>
</tr>
<tr>
<td>Engl 101 English Composition</td>
<td>EG 105 Engr. Graphics</td>
</tr>
<tr>
<td>Math 105 Alg. and Trig</td>
<td>Engl 102 English Composition</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>Math 106 Anal. Geom., Cal. I</td>
</tr>
<tr>
<td></td>
<td>Zool 101 Gen. Zoology</td>
</tr>
<tr>
<td></td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td><strong>16</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

### Sophomore Year

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agron 202 Soils</td>
<td>Bot 356 Taxonomy</td>
</tr>
<tr>
<td>For 201 Intro. to Forestry</td>
<td>For 202 Dendrology</td>
</tr>
<tr>
<td>For 203 Silvics</td>
<td>Math 205 Anal Geom., Cal. II</td>
</tr>
<tr>
<td>Geol 201 Physical Geol.</td>
<td>Phys 202 Gen. Physics</td>
</tr>
<tr>
<td>Phys 201 Gen. Physics</td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td>Phys 203 Gen. Physics Lab.</td>
<td><strong>20</strong></td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

### Forestry Summer Camp

<table>
<thead>
<tr>
<th></th>
<th>2 cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>For 251S Silvics</td>
<td>For 252S Forest Engineering</td>
</tr>
<tr>
<td>For 253S Dendrometry</td>
<td>For 254S Forest Products</td>
</tr>
</tbody>
</table>

### Junior Year

<table>
<thead>
<tr>
<th></th>
<th>3 (3.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ 201 Principles of Econ.</td>
<td>Bot 352 Plant Physiology</td>
</tr>
<tr>
<td>Ent 307 Forest Entomology</td>
<td>For 302 Dendrometry</td>
</tr>
<tr>
<td>Ex St 401 Intro. Statistics</td>
<td>For 304 Forest Economics</td>
</tr>
<tr>
<td>For 301 Aerial Forest Mapping</td>
<td>For 306 Wood Technology</td>
</tr>
<tr>
<td>For 303 Silviculture</td>
<td>Zool 312 Wildlife Management</td>
</tr>
<tr>
<td></td>
<td>Approved Electives*</td>
</tr>
<tr>
<td></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

### Senior Year

<table>
<thead>
<tr>
<th></th>
<th>3 (3.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bot 405 Forest Pathology</td>
<td>Engl 301 Public Speaking</td>
</tr>
<tr>
<td>For 403 Forest Products</td>
<td>For 402 Logging and Milling</td>
</tr>
<tr>
<td>For 405 Forest Protection</td>
<td>For 404 Management Plans</td>
</tr>
<tr>
<td>For 407 Forest Regulation</td>
<td>For 406 For. Policy &amp; Admin.</td>
</tr>
<tr>
<td>Gov 301 Am. Gov. and Pol. Par.</td>
<td>For 408 Forest Valuation</td>
</tr>
<tr>
<td>Approved Electives*</td>
<td>Approved Electives*</td>
</tr>
<tr>
<td></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

*At least three credits must be selected from the following courses: Geog 301, Geog 302, Hist 301, Psych 301, RS 301, Soc 301.
PRE-VETERINARY MEDICINE

The curriculum in Pre-Veterinary Medicine is designed to meet the general requirements of certain Schools of Veterinary Medicine. Since the requirements for entrance to these schools are not uniform, the student in planning his program should consider the specific requirements of the school he expects to attend. Under the Southern Regional plan qualified students from South Carolina may enter the School of Veterinary Medicine at the University of Georgia. The Pre-Veterinary curriculum meets the entrance requirements of the School of Veterinary Medicine at the University of Georgia.

PRE-VETERINARY MEDICINE

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Freshman Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agr 101 Introd. to Agr.</td>
<td>1 (1,0)</td>
<td>AH 102 Animal Science</td>
</tr>
<tr>
<td>Ch 101 Gen. Chemistry</td>
<td>4 (3,3)</td>
<td>AH 104 Animal Sci. Lab.</td>
</tr>
<tr>
<td>Engl 101 English Composition</td>
<td>3 (3,0)</td>
<td>Bot 101 General Botany</td>
</tr>
<tr>
<td>Math 103 Alg. and Trig.</td>
<td>4 (4,0)</td>
<td>Ch 102 Gen. Chemistry</td>
</tr>
<tr>
<td>Zool 101 Gen. Zoology</td>
<td>3 (3,0)</td>
<td>Engl 102 English Composition</td>
</tr>
<tr>
<td>Zool 103 Gen. Zoology Lab.</td>
<td>1 (0,3)</td>
<td>Hist 101 American History</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td><strong>17</strong></td>
<td></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 220 Elem. Org. Chem.</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Phys 201 Gen. Physics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Phys 203 Gen. Physics Lab.</td>
<td>1 (0,0)</td>
</tr>
<tr>
<td>PS 201 Introd. to Poultry Sci.</td>
<td>3 (2,3)</td>
</tr>
<tr>
<td>Zool 301 Comparative Vertebrate</td>
<td>3 (2,3)</td>
</tr>
<tr>
<td>Anatomy</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td><strong>18</strong></td>
<td></td>
</tr>
</tbody>
</table>

SCHOOL OF ARCHITECTURE

The School of Architecture has as its prime objective well-rounded professional education for architectural practice and for training prospective building contractors. Secondarily, it prepares students for service in other areas of the building industry. Cultural courses in the visual arts are offered by the School to students in other disciplines. Two professional five-year curriculums are offered—the curriculum in Architecture, leading to the degree, Bachelor of Architecture, with basic options in Design and Structure; and that in Building Construction, leading to the degree, Bachelor of Building Construction.

The development of man’s physical environment is the field of the architect, embracing fundamental consideration of function, structure and beauty. The scope of professional problems in architecture may vary in scale and complexity from the design of furniture to complex buildings and urban planning. To best serve society
in a rapidly changing era, the architect should retain a progressive attitude, and must understand and employ the aesthetic and technological tools at his disposal. Because of the nature of the profession, emphasis in all aspects of the School program is on creativity and maintaining standards of high quality. A broad background in the social sciences is necessary to the architect as a servant of humanity, as is a thorough training in the various disciplines of the profession which is at once an art and a science.

Architectural design is the core-course of the Architectural curriculum, engaging an increasing amount of the student’s time as he advances, and enabling him to employ creatively the knowledge gained in the theory courses.

The curriculum in Architecture is accredited by the National Architectural Accrediting Board. The School of Architecture is a member of the Association of Collegiate Schools of Architecture.

The building industry is the largest in the country and there is a tremendous demand for qualified persons to translate the work of the architect into physical reality. This is the professional responsibility of the Building Contractor. The professional curriculum in Building Construction embraces the four necessary basic disciplines. One, an understanding of the humanities, to develop a whole man. Second, a comprehension of building in its several aspects. Third, a knowledge of the business and economic aspects of building construction, and fourth, an understanding of the relevant technical disciplines. The curriculum has been organized with the approval of the South Carolina Board of Architectural Examiners, the South Carolina Board of Engineering Examiners, and the South Carolina Contractors Licensing Board. It is endorsed by the Carolinas’ Branch of the Association of General Contractors.

The physical facilities of the School of Architecture are excellent, being located in a newly constructed architectural building, which is part of the Structural Science Complex. Arranged around a courtyard and a large exhibition gallery, the School has flexible north-lighted studios for work in design and adjacent arts. Shops, offices, classrooms, and studios are carefully interrelated and well equipped. The architectural library adjoins the design studios of the School and is regarded as a controlled working area. The collection includes books, periodicals, manuscripts, slides, films and other visual aids, and is strengthened annually from purchases by the central College Library and through gifts and bequests.

Each year the regular class offerings of the School of Architecture are supplemented by a series of lectures by outstanding specialists
in various areas of architecture, and the adjunct arts and sciences. Such visits vary in length from two days to a month. The Architectural Gallery presents exhibits in architecture, painting, sculpture, and allied arts and crafts. The Clemson Architectural Foundation was established to assist in providing the lecture and exhibition programs, as well as field trips, scholarships, and other aids to the professional education of architects and contractors.

The School of Architecture reserves the right to require additional screening and procedures in addition to those required of other applicants for admission.

**ARCHITECTURE MAJOR**

<table>
<thead>
<tr>
<th></th>
<th>First Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arch 103 Environ. Tech. I</td>
<td>2 (1,3)</td>
<td>Arch 104 Environ. Tech. II</td>
</tr>
<tr>
<td>Arch 105 Visual Arts</td>
<td>2 (0,6)</td>
<td>Arch 106 Visual Arts</td>
</tr>
<tr>
<td>Arch 151 Basic Design</td>
<td>3 (1,12)</td>
<td>Arch 152 Basic Design</td>
</tr>
<tr>
<td>Engl 101 Engl. Composition</td>
<td>3 (3,0)</td>
<td>Engl 102 Engl. Composition</td>
</tr>
<tr>
<td>Math 105 Algebra and Trig.</td>
<td>4 (4,0)</td>
<td>Math 106 Anal Geom., Cal. I</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arch 251 Arch. Design</td>
<td>6 (1,15)</td>
<td>Arch 252 Arch. Design</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3 (3,0)</td>
<td>Engl 204 Survey of Engl. and Amer. Lit.</td>
</tr>
<tr>
<td>Phys 201 Gen. Phys.</td>
<td>3 (3,0)</td>
<td>Phys 202 General Physics</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td><strong>Third Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arch 309 Arch. History I</td>
<td>2 (2,0)</td>
<td>Arch 310 Arch. History II</td>
</tr>
<tr>
<td>Arch 351 Arch. Design</td>
<td>7 (1,18)</td>
<td>Arch 352 Arch Design</td>
</tr>
<tr>
<td>EM 302 Statics</td>
<td>3 (3,0)</td>
<td>EM 304 Mech. of Materials</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
<td>Electives</td>
</tr>
<tr>
<td><strong>Fourth Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arch 413 Arch. History III</td>
<td>2 (2,0)</td>
<td>Arch 414 Arch. History IV</td>
</tr>
<tr>
<td>Arch 415 Structural Methods</td>
<td>2 (2,0)</td>
<td>Arch 452 Arch. Design</td>
</tr>
<tr>
<td>Arch 451 Arch. Design</td>
<td>8 (2,18)</td>
<td>Arch 476 Mechanical Plant</td>
</tr>
<tr>
<td>Arch 475 Mechanical Plant</td>
<td>2 (2,0)</td>
<td>CE 416 Structural Design</td>
</tr>
<tr>
<td>CE 308 Structural Analysis</td>
<td>4 (3,3)</td>
<td>Engl 301 Public Speaking</td>
</tr>
<tr>
<td><strong>Fifth Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arch 480 Office Practice</td>
<td>2 (2,0)</td>
<td>Arch 405 Visual Arts</td>
</tr>
<tr>
<td>Arch 491 Arch. &amp; Town Plan.</td>
<td>11 (5,18)</td>
<td>Arch 481 Office Practice</td>
</tr>
<tr>
<td>Electives</td>
<td>4</td>
<td>Arch 492 Arch. Thesis</td>
</tr>
<tr>
<td><strong>Option I</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fourth Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arch 413 Arch. History III</td>
<td>2 (2,0)</td>
<td>Arch 405 Visual Arts</td>
</tr>
<tr>
<td>Arch 415 Structural Methods</td>
<td>2 (2,0)</td>
<td>Arch 414 Arch. History IV</td>
</tr>
<tr>
<td>Arch 453 Adv. Arch. Const.</td>
<td>4 (1,9)</td>
<td>Arch 476 Mechanical Plant</td>
</tr>
<tr>
<td>Arch 475 Mechanical Plant</td>
<td>2 (2,0)</td>
<td>CE 407 Structural Design</td>
</tr>
<tr>
<td>CE 308 Structural Analysis</td>
<td>4 (3,3)</td>
<td>CE 414 Soil Mechanics</td>
</tr>
<tr>
<td>Geol 406 Engr. Geology</td>
<td>3 (2,3)</td>
<td>Engl 301 Public Speaking</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
<td>Electives</td>
</tr>
<tr>
<td><strong>Option II</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fourth Year</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arch 413 Arch. History III</td>
<td>2 (2,0)</td>
<td>Arch 405 Visual Arts</td>
</tr>
<tr>
<td>Arch 415 Structural Methods</td>
<td>2 (2,0)</td>
<td>Arch 414 Arch. History IV</td>
</tr>
<tr>
<td>Arch 453 Adv. Arch. Const.</td>
<td>4 (1,9)</td>
<td>Arch 476 Mechanical Plant</td>
</tr>
<tr>
<td>Arch 475 Mechanical Plant</td>
<td>2 (2,0)</td>
<td>CE 407 Structural Design</td>
</tr>
<tr>
<td>CE 308 Structural Analysis</td>
<td>4 (3,3)</td>
<td>CE 414 Soil Mechanics</td>
</tr>
<tr>
<td>Geol 406 Engr. Geology</td>
<td>3 (2,3)</td>
<td>Engl 301 Public Speaking</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
<td>Electives</td>
</tr>
</tbody>
</table>
Each class adviser has an up-to-date list of approved electives giving suggested course sequences. Any exceptions to this list must be approved in writing by the Dean of the School.

### BUILDING CONSTRUCTION MAJOR

#### First Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arch 103 Environ. Tech.</td>
<td>Arch 104 Environ. Tech. II</td>
</tr>
<tr>
<td>Arch 105 Visual Arts</td>
<td>Arch 106 Visual Arts</td>
</tr>
<tr>
<td>Arch Const 141 Elem. of Bldg. I</td>
<td>Arch Const 142 Elem. of Bldg. IV</td>
</tr>
<tr>
<td>Math 105 Algebra and Trig.</td>
<td>Math 106 Anal Geom., Cal. I</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>AS or MS—Basic</td>
</tr>
</tbody>
</table>

#### Third Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acct 201 Prin. of Accounting</td>
<td>Acct 202 Prin. of Accounting</td>
</tr>
<tr>
<td>Econ 201 Prin. of Economics</td>
<td>Econ 202 Prin. of Economics</td>
</tr>
<tr>
<td>EM 302 Statics</td>
<td>EM 304 Mech. of Materials</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
<td>Psych 301 General Psychology</td>
</tr>
<tr>
<td>Soc 301 Intro. of Sociology</td>
<td>Soc 302 Social Problems</td>
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</table>

#### Fourth Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arch 413 Arch. History III</td>
<td>Arch 414 Arch. History IV</td>
</tr>
<tr>
<td>Arch 415 Structural Methods</td>
<td>Arch 476 Mechanical Plant</td>
</tr>
<tr>
<td>Arch 475 Mechanical Plant</td>
<td>CE 414 Soil Mechanics</td>
</tr>
<tr>
<td>CE 308 Structural Design</td>
<td>CE 416 Structural Design</td>
</tr>
<tr>
<td>Geol 406 Engr. Geology</td>
<td>IM 302 Industrial Management</td>
</tr>
<tr>
<td>IM 301 Cost Accounting</td>
<td>Soc 405 Industrial Sociology</td>
</tr>
<tr>
<td>Math 303 Statistics</td>
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</table>

#### Fifth Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arch 480 Office Practice</td>
<td>Arch 481 Office Practice</td>
</tr>
<tr>
<td>Econ 312 Commercial Law</td>
<td>Econ 313 Commercial Law</td>
</tr>
<tr>
<td>IE 303 Job Evaluation</td>
<td>IE 304 Motion and Time Study</td>
</tr>
<tr>
<td>Electives</td>
<td>Electives</td>
</tr>
</tbody>
</table>
Sciences offers four major curriculums leading to the Bachelor of Science degree which are as follows: Applied Mathematics, Chemistry, Physics, and Pre-Medicine. In addition, the School offers a curriculum in the Arts and Sciences leading to the Bachelor of Arts degree. Major concentrations under the Bachelor of Arts program may be taken in the following areas: Economics, English, Geology; History, Mathematics, Modern Languages, or Natural Sciences. Furthermore, the School of Arts and Sciences offers programs leading to graduate degrees in several of these fields.

Students majoring in the School of Arts and Sciences should secure from the Office of Admissions and Registration or from the Office of the Dean of the School of Arts and Sciences, the Handbook for Students Majoring in the School of Arts and Sciences, the purpose of which is to provide detailed information to Bachelor of Arts students about the possible major and minor concentrations and a list of approved electives in other schools of the College for students majoring in the School of Arts and Sciences.

**BACHELOR OF ARTS CURRICULUM**

The curriculum leading to the Bachelor of Arts degree is designed to meet the needs of those students who desire a broad general education as a preparation for intelligent citizenship and for those who desire to teach in the secondary schools. The first two years are spent in introductory work in various areas, in order to give the student breadth of view and to enable him to take a more intelligent part in his own education. During the last two years the student concentrates in selected fields. This curriculum provides an excellent background for pre-law students, business, and journalism.

The work required in the Bachelor of Arts curriculum for the freshman year is as shown below, with the few exceptions noted depending on major or minor concentrations during the later years.

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Freshman Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl 101 Engl. Composition</td>
<td>3 (3.0)</td>
<td>Engl 102 Engl. Composition</td>
</tr>
<tr>
<td>Hist 101 American History</td>
<td>3 (3.0)</td>
<td>Hist 102 American History</td>
</tr>
<tr>
<td>Math 101 Math. Analysis†</td>
<td>3 (3.0)</td>
<td>Math 102 Math. Analysis†</td>
</tr>
<tr>
<td>Modern Language</td>
<td>3 (3.0)</td>
<td>Modern Language</td>
</tr>
<tr>
<td>Physical Science†</td>
<td>4</td>
<td>Physical Science†</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
<td>AS or MS—Basic</td>
</tr>
</tbody>
</table>

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† Those students planning to concentrate in Geology, Mathematics, or Natural Sciences schedule Math 105, 106 instead of Math 101, 102.

†† Election of a two semester sequence of the same Physical Science is required; however, those concentrating in Natural Sciences must schedule Chemistry.
Preferably on entrance, and not later than the end of his sophomore year, each student in the Bachelor of Arts curriculum must select a primary and secondary (major and minor) field of concentration from the following:

<table>
<thead>
<tr>
<th>Major</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics</td>
<td>Economics</td>
</tr>
<tr>
<td>English</td>
<td>English</td>
</tr>
<tr>
<td>Geology</td>
<td>Geology</td>
</tr>
<tr>
<td>History</td>
<td>History</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Modern Languages</td>
<td>Modern Languages</td>
</tr>
<tr>
<td>Natural Sciences</td>
<td>Secondary Education</td>
</tr>
<tr>
<td></td>
<td>Sociology</td>
</tr>
</tbody>
</table>

The major concentration requires 24 semester hours and the minor, 15 semester hours.

These fit into the basic curriculum for the three upper-class years with minor variations depending on the specific major or minor selected.

<table>
<thead>
<tr>
<th>SOPHOMORE YEAR</th>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bot 101 General Botany</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td></td>
<td>Econ 201 Prin. of Economics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td></td>
<td>Engl 203 Surv. of Engl. Lit.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td></td>
<td>Hist 203 Hist. of Civilization</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td></td>
<td>Modern Language*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JUNIOR YEAR</td>
<td>Humanities†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Major</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Minor</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Modern Language*</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
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<tr>
<td>SENIOR YEAR</td>
<td>Major</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Minor</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Social Sciences†</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

* The student may elect either 3 years of 1 foreign language or 2 years of each of 2 languages.
† Humanities include Art, English, Foreign Languages, Music, Philosophy and Religion.
‡ Social Sciences include Economics, Government, History, Psychology and Sociology.

Detailed information concerning the various combinations of majors and minors is as follows:

**Economics.** The recommended program of study consists of the required courses of the basic Bachelor of Arts curriculum plus Econ 202. The latter course should be taken the second half of the
sophomore year and Music 310 postponed until the junior year. The Econ 202 will be substituted for a 3-hour elective.

Twenty-four semester hours must be completed to fulfill the requirements for a major field of concentration and 15 semester hours to fulfill the requirements for a minor field of concentration. Courses for a concentration shall be chosen from the following list and shall include Econ 314:


It is strongly recommended that students who anticipate graduate study in economics, minor in mathematics.

Additional approved electives will be added as needed to meet the total semester hours required for graduation.

**English.** For a major concentration, the recommended program of study consists of the required courses of the basic Bachelor of Arts curriculum and 24 semester hours of English above the sophomore level, including the following:

Engl 402, 405 or 406, 423 or 424.

Three courses from the following are required:


One course from the following is required:

Engl 415, 416, 435, 437, 438, 440, 441, 442.

Additional electives from courses listed below will be added as needed to meet the total semester hours required for graduation:


Engl 304, Advanced Composition, or departmental certification of proficiency in composition is required.

For a minor concentration in English, the recommended program of study consists of the required courses of the basic Bachelor of Arts curriculum and 15 semester hours of English above the sophomore level, including:

Engl 402, 405 or 406, 423 or 424.

One course from the following is required:


Additional electives from English courses numbered above 400 will be added as needed to meet the total semester hours required for graduation. Engl 304, Advanced Composition, or departmental certification of proficiency in composition is required.

**Geology.** The recommended program in Geology consists of the required courses in the basic Bachelor of Arts curriculum with the
additional requirement that students majoring or minoring in Geology must take Math 105 and 106 instead of Math 101 and 102 in the freshman year and Math 205 and 206 in place of Econ 201 and Music 310 in the sophomore year. The latter two courses will be taken in place of electives in the junior year.

Geology majors or minors may elect a second year of Physical Science postponing their Biological Sciences to the junior year.

Twenty-four semester hours must be completed to fulfill the requirements for the primary field of concentration and 15 semester hours to fulfill the requirements for the secondary field of concentration. Courses for concentration are as follows:


Additional approved electives will be added as needed to meet the total semester hours required for graduation.

History. The recommended program of study consists of the required courses in the basic Bachelor of Arts curriculum plus Gov 301. The latter course should be taken as the required elective the first half of the junior year.

Twenty-four semester hours must be completed to fulfill the requirements for the primary field of concentration and 15 semester hours to fulfill the requirements for the secondary field of concentration. Courses for concentration shall be chosen from the following list:

Hist 309, 312, 401, 402, 403, 406, 408, 410, 411, 412, 413.

Additional approved electives will be added as needed to meet the total semester hours required for graduation.

Mathematics. The recommended program in Mathematics is determined by the secondary field of concentration. For students planning to teach Mathematics in secondary schools the regular Bachelor of Arts curriculum must be materially changed and the complete schedule is shown below. For students with any other minor concentration, the program is as follows:

The required basic courses of the Bachelor of Arts curriculum with the additional requirement that students majoring or minoring in Mathematics must take Math 105 and 106 instead of Math 101 and 102 in the freshman year and Math 205 and 206 in place of Econ 201 and Music 310 in the sophomore year.

Mathematics majors or minors may elect a second year of Physical Science, postponing their Biological Sciences until the junior year.

Twenty-four semester hours must be completed to fulfill the requirement for the primary field of concentration and 15 semester
hours to fulfill the requirements for the secondary field of concentration. Courses for concentration shall be chosen from the following list and must include Math 205, 206, and 306:


Additional approved electives will be added as needed to meet the total semester hours required for graduation.

CURRICULUM FOR PROSPECTIVE MATHEMATICS TEACHERS WITH A MINOR IN SECONDARY EDUCATION

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td></td>
</tr>
<tr>
<td>Bot 101 General Botany</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. and Literat.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Hist 203 Hist. of Civilization</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Language</td>
<td>3</td>
</tr>
<tr>
<td>Math 205 Anal. Geom., Cal. II</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>18</td>
</tr>
<tr>
<td><strong>Junior Year</strong></td>
<td></td>
</tr>
<tr>
<td>Econ 201 Prin. of Economics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Ed 201 Introd. to Amer. Ed.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Language</td>
<td>3</td>
</tr>
<tr>
<td>Math (2 courses)</td>
<td>6</td>
</tr>
<tr>
<td>Elective†</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
</tr>
<tr>
<td><strong>Senior Year</strong></td>
<td></td>
</tr>
<tr>
<td>Ed 335 Adol. Growth &amp; Devel.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Math (2 courses)</td>
<td>6</td>
</tr>
<tr>
<td>Electives†</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
</tr>
</tbody>
</table>

* If a second year of a physical science is desired, these courses should be taken in the sophomore year and replace the botany and zoology for that year. The botany and zoology must then be taken later, at the expense of two elective courses.
† Electives must include Arch 403 and a social science course other than history.
‡ The last semester of the senior year is a block course and must be taken as listed.

Modern Languages. The recommended program in Modern Languages consists of the required courses of the basic Bachelor of Arts curriculum and 24 semester hours in one language or 18 semester hours in one language and 12 semester hours in a second language to fulfill the requirements for the primary field of concentration. Only courses numbered 301 and above may be used in fulfilling these requirements. Courses for concentration shall be chosen from the following, all of which are 3 cr. (3,0):

Ger 303, 304, 305, 306, 403, 404.

* Required of students with the primary field of concentration in French.
† Required of students with the primary field of concentration in German.
‡ Required of students with the primary field of concentration in Spanish.
Additional approved electives will be added as needed to meet the total semester hours required for graduation.

**Natural Sciences Concentration**

(In conjunction with a secondary concentration in Education only)

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Sophomore Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bot 101 General Botany</td>
<td>4 (3.3)</td>
<td>Engl 204 Survey of Engl and Amer. Lit.</td>
</tr>
<tr>
<td>Engl 203 Surv. of Engl. Lit.</td>
<td>3 (3.0)</td>
<td>Hist 204 Hist. of Civilization</td>
</tr>
<tr>
<td>Hist 203 Hist. of Civilization</td>
<td>3 (3.0)</td>
<td>Language</td>
</tr>
<tr>
<td>Language</td>
<td>3 (3.0)</td>
<td>Math 206 Anal. Geom., Cal. II</td>
</tr>
<tr>
<td>Math 205 Anal. Geom., Cal. II</td>
<td>4 (4.0)</td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>JUNIOR YEAR</td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Econ 201 Prin. of Economics</td>
<td>3 (3.0)</td>
<td>Ed 302 Educational Psych.</td>
</tr>
<tr>
<td>Ed 201 Introd. to Amer. Ed.</td>
<td>3 (3.0)</td>
<td>Geol 304 Historic. Geol.</td>
</tr>
<tr>
<td>Geol 201 Physical Geology</td>
<td>3 (3.0)</td>
<td>Geol 305 Historic. Geol. Lab.</td>
</tr>
<tr>
<td>Geol 206 Phys. Geol. Lab.</td>
<td>1 (0.3)</td>
<td>Language</td>
</tr>
<tr>
<td>Language</td>
<td>3 (3.0)</td>
<td>Phys 202 Gen. Phys.</td>
</tr>
<tr>
<td>Phys 201, 203 General Physics</td>
<td>4 (3.3)</td>
<td>Phys 204 Gen. Phys. Lab.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Social Science Elective</td>
</tr>
<tr>
<td></td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>SENIOR YEAR</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Arch 408 Introd. to Visual Arts</td>
<td>3 (3.0)</td>
<td>Ed 412 Directed Teaching*</td>
</tr>
<tr>
<td>Ed 335 Adol. Growth &amp; Develop.</td>
<td>3 (3.0)</td>
<td>Ed 424 Techniques of Teaching</td>
</tr>
<tr>
<td>Phys 304 Descriptive Astronomy</td>
<td>3 (3.0)</td>
<td>Ed 458 Health Education</td>
</tr>
<tr>
<td>Sciences Elective</td>
<td>5</td>
<td>Music 310 Music Appreciation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or Arch 403 Introd. to Vis. Arts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

Elective to be taken in one field: Chemistry, Physics, Biology, or Geology—6 hours.
This major combined with Education would meet all state requirements for certification in Natural Science, General Science, and one Science field.
* The last semester of the senior year is a block schedule and must be taken as listed.

**Secondary Education (Secondary Field of Concentration Only).**

The recommended program of study consists of the required courses in the Bachelor of Arts curriculum, a required major concentration in the Bachelor of Arts curriculum, and the basic program specified by the South Carolina State Department of Education. This list of requirements should be obtained from the Education Adviser before registering for the sophomore year.

The following education courses are required:

Ed 201, 302, 335, 412, 424.

Ed 201, 302, 335 and 424 must be completed in sequence before registering for Ed 412, Directed Teaching. Application to the instructor in charge of Directed Teaching should be made, in writing, twelve months before scheduling Ed 412. A student whose cumulative grade-point ratio is lower than the requirement for graduation will not be permitted to register for Directed Teaching.

Beginning with the second semester, 1962-1963, Ed 412 will be conducted on a full-day basis for one-half semester. Students taking Ed 412 will register for Ed 424, 458 and Music 310, these three
courses being taught on a six-day basis during the first half of the semester.

Recommended teaching fields (primary fields of concentration) are English, Mathematics, Modern Languages, Natural Sciences, and Social Sciences. Requirements for teacher certification vary with the fields. Each semester after the freshman year, course schedules must be approved by the Education Adviser, prior to registration.

Additional approved electives will be added as needed to meet the total semester hours required for graduation.

Sociology (Secondary Field of Concentration Only). The recommended program of study consists of the required courses in the Bachelor of Arts curriculum plus Gov 301. The latter course should be taken as the required elective the first half of the junior year.

Fifteen semester hours must be completed to fulfill the requirements for the secondary field of concentration. Courses for concentration shall be chosen from the following list and shall include Soc 301 and 302:

Soc 301, 302, 402, 403, 404, 405, 406, 407, 408.

Additional approved electives will be added as needed to meet the total semester hours required for graduation.

**BACHELOR OF SCIENCE CURRICULUMS**

**APPLIED MATHEMATICS**

The Applied Mathematics curriculum is designed to give basic training to those students who desire to become mathematicians in various fields, such as the design or operation of computers, automation, nuclear science, statistics, or any branch of the physical sciences in which a strong mathematical foundation is a prerequisite. It includes advanced courses in physics to acquaint the student with the use of fundamental mathematical laws in this area, which in turn are applied in various scientific fields.

This curriculum provides more than the minimum training in mathematics required for entrance into most graduate schools.

### APPLIED MATHEMATICS MAJOR

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ch 101 General Chemistry 4 (3,3)</td>
<td>Ch 102 Gen. Chemistry 4 (3,3)</td>
</tr>
<tr>
<td></td>
<td>Engl 101 Engl. Composition 3 (3,0)</td>
<td>Engl 102 Engl. Composition 3 (3,0)</td>
</tr>
<tr>
<td></td>
<td>Fr 101 Elementary French 3 (3,0)</td>
<td>Fr 102 Elementary French 3 (3,0)</td>
</tr>
<tr>
<td>or Ger 101 Elem. German 3 (3,0)</td>
<td>or Ger 102 Elem. German 3 (3,0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hist 101 American History 3 (3,0)</td>
<td>Hist 102 American History 3 (3,0)</td>
</tr>
<tr>
<td></td>
<td>Math 105 Algebra and Trig. 4 (4,0)</td>
<td>Math 106 Anal. Geom., Cal. I 4 (4,0)</td>
</tr>
<tr>
<td></td>
<td>AS or MS—Basic 1 (2,1)</td>
<td>AS or MS—Basic 1 (2,1)</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>18</td>
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</table>
SOPHOMORE YEAR

First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ 201 Prin. of Economics</td>
<td>3</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Fr 201 Intermediate French</td>
<td>3</td>
</tr>
<tr>
<td>or Ger 201 Inter. German</td>
<td>3</td>
</tr>
<tr>
<td>Math 205 Anal. Geom., Cal. II</td>
<td>4</td>
</tr>
<tr>
<td>Phys 211 Gen. Phys. for Engr.</td>
<td>4</td>
</tr>
<tr>
<td>Phys 213 Gen. Phys. Lab.</td>
<td>1</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1</td>
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</table>

Total: 19

Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Econ 202 Prin. of Economics</td>
<td>3</td>
</tr>
<tr>
<td>Engl 204 Survey of Engl. and</td>
<td>3</td>
</tr>
<tr>
<td>Amer. Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Fr 202 Intermediate French</td>
<td>3</td>
</tr>
<tr>
<td>or Ger 202 Inter. German</td>
<td>3</td>
</tr>
<tr>
<td>Math 206 Anal. Geom., Cal. III</td>
<td>4</td>
</tr>
<tr>
<td>Phys 212 Gen. Phys. for Engr.</td>
<td>4</td>
</tr>
<tr>
<td>Phys 214 Gen. Phys. Lab.</td>
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</tr>
<tr>
<td>AS or MS—Basic</td>
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Total: 19

JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Engl 301 Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>Hist 203 History of Civilization</td>
<td>3</td>
</tr>
<tr>
<td>Math 306 Diff. Equations</td>
<td>3</td>
</tr>
<tr>
<td>Math 311 Introd. Mod. Alg.</td>
<td>3</td>
</tr>
<tr>
<td>Phys 321 Mechanics I</td>
<td>3</td>
</tr>
<tr>
<td>Phys 323 Exp. Mech.</td>
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<tr>
<td>Elective</td>
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</table>

Total: 19

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 302 Theory of Equations</td>
<td>3</td>
</tr>
<tr>
<td>Math 451 Vector Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Phys 341 Elec. and Mag.</td>
<td>3</td>
</tr>
<tr>
<td>Phys 343 Elec. Meas.</td>
<td>2</td>
</tr>
<tr>
<td>Phys 351 Mod. Physics</td>
<td>3</td>
</tr>
<tr>
<td>Phys 353 Mod. Physics Lab.</td>
<td>1</td>
</tr>
<tr>
<td>Elective</td>
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Total: 18

SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hist 204 History of Civilization</td>
<td>3</td>
</tr>
<tr>
<td>Math 403 Math. Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Math 453 Advanced Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Phys 441 Elec. and Mag.</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
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</tbody>
</table>

Total: 18

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 402 Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>Math 404 Math. Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Math 409 Theory of Approx.</td>
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</tr>
<tr>
<td>Math 454 Advanced Calculus</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Total: 15

CHEMISTRY

The Chemistry curriculum is designed to give the student a thorough knowledge of the fundamental principles of chemistry. The course is so arranged that each student takes approximately the same number of hours of work in each of the four fundamental branches of chemistry—Inorganic, Analytical, Organic and Physical. Additional work may be scheduled in any of these fields in which the student is particularly interested. The number of allowable elective credits is great enough to enable the student to take work in related fields, such as engineering, textile chemistry, physics, bacteriology, etc. Graduates of the Chemistry curriculum are prepared for employment in any of the chemical industries in laboratory, plant control or sales work, as well as in Experiment Stations. Many of our graduates go to other institutions for graduate work and the number of our Chemistry graduates who have obtained graduate degrees is impressive. These men are well distributed through industry and research institutions. The Chemistry Department is fully accredited by the American Chemical Society.
# CHEMISTRY MAJOR

## First Semester
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 101 General Chemistry</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>Engl 101 Engl. Composition</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Ger 101 Elementary German</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Hist 101 American History</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Math 105 Algebra and Trig.</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

## Second Semester
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 102 Gen. Chemistry</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>Engl 102 Engl. Composition</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Ger 102 Elementary German</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Math 106 Anal. Geom., Cal. I</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td>Elective*</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

## Sophomore Year
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 323 Org. Chem.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Ch 325 Org. Chem. Lab.</td>
<td>2 (0,6)</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Math 205 Anal. Geom., Cal. II</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>Phys 211 Gen. Phys. for Engr.</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>Phys 213 Gen. Phys. Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

## Junior Year
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 316 Quan. Analysis</td>
<td>5 (3,6)</td>
</tr>
<tr>
<td>Ch 331 Phys. Chemistry</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Ch 333 Phys. Chemistry Lab.</td>
<td>2 (0,6)</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Math 306 Ord. Diff. Equations</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Elective*</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

## Senior Year
<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 402 Inorg. Chem.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Electives*</td>
<td>15</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

## Electives:
For the degree of B.S. in Chemistry, a student must elect at least 18 hours in English, Languages, History, Government, Economics, Sociology, Psychology, etc.

# PHYSICS

The curriculum in Physics is intended to give a thorough knowledge of the fundamental principles of physics. This course combines sound theoretical training and extensive laboratory practices in the various branches of physics with considerable work in one related field such as Chemistry or Electrical Engineering. The student is required to take at least two advanced mathematics courses; other technical courses may be taken as electives if desired. On completing this curriculum the student should be prepared to enter research in an industrial or government laboratory; the curriculum also provides an excellent background for advanced work in the field of nuclear science, or for graduate work in Physics.
### PHYSICS MAJOR

#### First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 101 General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>EG 105 Engr. Graphics</td>
<td>2</td>
</tr>
<tr>
<td>Engl 101 Engl. Composition</td>
<td>3</td>
</tr>
<tr>
<td>Ger 101 Elementary German*</td>
<td>3</td>
</tr>
<tr>
<td>Math 105 Algebra and Trig.</td>
<td>4</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

#### Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 102 Gen. Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>Engl 102 Engl. Composition</td>
<td>3</td>
</tr>
<tr>
<td>Ger 102 Elementary German*</td>
<td>3</td>
</tr>
<tr>
<td>Math 106 Anal. Geom., Cal. I</td>
<td>4 (4,0)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td><strong>Approved Elective</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

#### Sophomore Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3</td>
</tr>
<tr>
<td>Math 205 Anal. Geom., Cal. II</td>
<td>4</td>
</tr>
<tr>
<td>Phys 211 Gen. Phys. for Engr.</td>
<td>4</td>
</tr>
<tr>
<td>Phys 213 Gen. Phys. Lab.</td>
<td>1</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

#### Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hist 204 Hist. of Civilization or Engl 301</td>
<td>3</td>
</tr>
<tr>
<td>Math 306 Ord. Diff. Equations</td>
<td>3</td>
</tr>
<tr>
<td>Phys 321 Mechanics I</td>
<td>3</td>
</tr>
<tr>
<td>Phys 323 Exp. Mech.</td>
<td>1</td>
</tr>
<tr>
<td>Phys 332 Light</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

#### Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 320 Electronics I</td>
<td>3</td>
</tr>
<tr>
<td>EE 322 Electronics I Lab.</td>
<td>1</td>
</tr>
<tr>
<td>Phys 421 Mechanics II</td>
<td>3</td>
</tr>
<tr>
<td>Phys 441 Elect, and Magn.</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

* Fr 101, 102 or Russ 101, 102 may be substituted for Ger 101, 102.

### PRE-MEDICINE

The curriculum in Pre-Medicine is designed to meet the general entrance requirements of standard medical colleges. Since, however, requirements for entrance to various medical schools are not uniform, the student before choosing his electives should consult the specific requirements of the medical college of his preference.

Those preparing for the study of medicine are advised to complete four years of undergraduate work before entering a medical school, although some medical colleges will accept a student after three years of Pre-Medicine.

The total number of hours required for graduation is 144. Students enrolled in the advanced ROTC program may use 6 semester hours of advanced military courses in this total.

Students preparing for the study of dentistry find this curriculum appropriate for the purpose. If a student plans to complete his pre-dental work in two years, slight rearrangement in the sequence of chemistry courses may be necessary and is permitted.
### First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 101 General Chemistry</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>Engl 101 Engl. Composition</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Hist 101 American History</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Math 101 Mathematical Analysis</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Modern Language</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
</tr>
</tbody>
</table>

### Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bot 101 General Botany</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>Ch 102 General Chemistry</td>
<td>4 (3,3)</td>
</tr>
<tr>
<td>Engl 102 Engl. Composition</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Modern Language</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
</tr>
</tbody>
</table>

### Sophomore Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 323 Org. Chem.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Ch 327 Org. Chem. Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Hist 102 American History</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Modern Language</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Zool 101 Gen. Zoology</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Zool 103 Gen. Zool. Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
</tr>
</tbody>
</table>

### Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 316 Quan. Analysis</td>
<td>5 (3,6)</td>
</tr>
<tr>
<td>Econ 202 Prin. of Economics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Hist 203 Hist. of Civilization</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Phys 202 Gen. Physics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Phys 204 Gen. Physics Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
</tr>
<tr>
<td>Agron 302 Genetics</td>
<td>3 (2,3)</td>
</tr>
<tr>
<td>Hist 204 History of Civilization</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Phys 301 General Psychology</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Zool 301 Comp. Vert. Anat.</td>
<td>3 (2,3)</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
</tr>
</tbody>
</table>

### Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl 301 Public Speaking</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Soc 301 Introd. Sociology</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Zool 302 Vertebrate Embryology</td>
<td><strong>3 (2,3)</strong></td>
</tr>
<tr>
<td>Electives</td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

### Approved Electives for Students in the School of Arts and Sciences

The following are approved electives in the School of Arts and Sciences:

All undergraduate courses taught in the School of Arts and Sciences except the following:


Certain upper level courses, not given in the School of Arts and Sciences, listed below plus others recommended in a particular Arts and Sciences curriculum:


In exceptional instances certain other courses, but not in excess of 6 semester hours for the Bachelor of Arts program and 9 hours for other Arts and Sciences curriculums may be approved by the class adviser and the Dean of the School of Arts and Sciences.
SCHOOL OF ENGINEERING

Nine curriculums are offered under the School of Engineering: Agricultural Engineering, Ceramic Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Education, Industrial Engineering, Mechanical Engineering, and Metallurgical Engineering. The curriculums in Agricultural, Ceramic, Chemical, Civil, Electrical, and Mechanical Engineering are accredited by the Engineers' Council for Professional Development. The curriculum in Agricultural Engineering is jointly administered by the School of Engineering and the School of Agriculture.

Although the School of Engineering does not offer specific options or majors under each of these curriculums, the training includes many phases of each respective field. Thus, a Civil Engineering student is graduated in Civil Engineering rather than hydraulic engineering, highway engineering, sanitary engineering or other such options, but the curriculum in Civil Engineering includes definite training along these lines. In the same way, the other engineering curriculums include thorough training in various phases of the field of specialization without over-emphasizing one phase to the neglect of others.

All engineering consists of the application of the laws of physics, chemistry, and mathematics to the solution of specific problems. Furthermore, any engineer must be able to express his ideas both in words and in drawings. For these two reasons the first two years of all the branches of Engineering here listed are substantially the same and deal largely with the fundamentals mentioned above.

Very few materials in nature are in such a geometrical form or condition that they can be used by the engineer for transmitting or resisting forces without conversion into a desired form or condition. There are many conversion processes available to the engineer. Since each has its specific quality, cost, and availability parameters, the engineer must have a sound grasp of the characteristics of diverse processes. Without this knowledge his work can neither be creative nor meet the requirements imposed by the competitive economic system. For this reason courses concerned with production (conversion) processes are included in all curriculums even though a quantitative study of the fundamentals underlying these processes may not be a primary objective of a particular curriculum.

In all curriculums, over-specialization is carefully avoided by the inclusion of subjects which involve the most direct application
of the basic sciences and which serve to develop habits of orderly analysis and logical thinking.

The work required in all Engineering curriculums for the freshman year is as follows except as noted:

<table>
<thead>
<tr>
<th>Freshman Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>Ch 101 General Chemistry</td>
<td>Ch 102 General Chemistry</td>
</tr>
<tr>
<td>EG 107 Engr. Graphics</td>
<td>EG 108 Engr. Graphics</td>
</tr>
<tr>
<td>Engl 101 Engr. Composition</td>
<td>Engl 102 Engr. Composition</td>
</tr>
<tr>
<td>IE 101 Mfg. Processes</td>
<td>Hist 104 Western Civilization</td>
</tr>
<tr>
<td>or Hist 104 Western Civ.</td>
<td>or IE 101 Mfg. Processes</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

* Agricultural Engineering students take Agr 101, Introduction to Agriculture, in addition to other courses in the second semester.

AGRICULTURAL ENGINEERING

The Agricultural Engineering curriculum is jointly administered by the School of Agriculture and the School of Engineering.

Agricultural Engineering deals fundamentally with the application of the engineering sciences to the problems of agriculture. Agricultural engineers provide engineering services in the areas of power and machinery, soil and water conservation engineering, farm electrification, farm structures, and agricultural processing.

Opportunities in Agricultural Engineering include employment with industry as design engineers, research engineers, production engineers, and in sales and service; with state and federal agencies as teachers, research engineers, and extension engineers; as field engineers with soil conservation service, bureau of reclamation, etc.; with agricultural enterprises as managers, contractors, equipment retailers and consulting engineers. The Agricultural Engineering curriculum is accredited by the Engineers’ Council for Professional Development.

AGRICULTURAL ENGINEERING MAJOR

(See page 108 for Freshman Year)

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>AgE 203 Agric. Engr. Prob.</td>
<td>Agron 102 Crop Science</td>
</tr>
<tr>
<td>AgE 207 Farm Mechanics</td>
<td>EM 302 Statics</td>
</tr>
<tr>
<td>Bot 101 General Botany</td>
<td>Engl 204 Survey of Engl. and Amer. Lit.</td>
</tr>
<tr>
<td>Phys 213 Gen. Phys. Lab.</td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>
CERAMIC ENGINEERING

The ceramic industries have as their raw materials the non-metallic minerals other than fuel. These minerals constitute over 90 per cent of the earth’s crust while the industries dependent on them comprise almost one-third the entire field of industrial activity. Ceramic industries produce products in eight major classifications: structural clay products; glass whitewares; refractories; abrasives; cements; limes and plaster; enameled metals; and raw material processing.

South Carolina possesses a wide variety of ceramic minerals which rank with forests as the richest natural resources in the State and make it possible for South Carolina to contribute raw materials to every major classification of the ceramic industry. South Carolina has a diversified ceramic industry with plants manufacturing portland cement, glass containers, glass fibers, sewer pipes, brick, refractories, special raw materials, and whitewares. The growth of these industries and the development of new ones is to a large measure dependent on the availability of trained engineers capable of incorporating and operating the modern techniques and equipment of the ceramic industries.

The curriculum of Ceramic Engineering leads to the degree of Bachelor of Science in Ceramic Engineering, and graduate courses are offered leading to advanced degrees. The course is based on a study of the fundamental courses in chemistry, physics, mathematics, and geology, and advanced courses are designed to apply these fundamental sciences to Ceramic Engineering. The Ceramic Engineering student receives basic training in general engineering and the fundamentals of civil, electrical, and mechanical engineering. In the Ceramic Engineering courses emphasis
is placed on the principles of manufacture common to all ceramic industries. The Ceramic Engineering student may choose certain elective courses from the humanistic and social subjects.

The Olin Foundation in 1953 provided a grant for the construction and equipping of a Ceramic Engineering building. The grant has provided Clemson College with the outstanding facilities for Ceramic Engineering education and research. An excellent ceramic laboratory has been equipped to demonstrate all processes of ceramic manufacturing including beneficiation of ores and clays, grinding and crushing materials, mixing and blending raw materials, forming the materials into various shapes, and drying and firing the prepared objects. Equipment for the control of industrial processes is studied and tests are made to determine the quality of various ceramic products. Well-equipped laboratories are available for research on raw materials and problems of ceramic industries in South Carolina.

Ceramic Engineering graduates find employment as plant executives, research engineers, plant designers and constructors, equipment manufacturers, consulting engineers, ceramic chemists, and technologists in the ceramic industries and in allied fields.

**CERAMIC ENGINEERING MAJOR**
(See page 147 for Freshman Year)

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CrE 201 Introduct. to Cr. Eng.</td>
<td>CrE 202 Ceramic Materials</td>
</tr>
<tr>
<td>CrE 203 Survey of Engr. Lit.</td>
<td>CrE 204 Lab. Procedures</td>
</tr>
<tr>
<td>Math 205 Anal. Geom., Cal. II</td>
<td>EM 306 Statics</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>Phys 212 Gen. Phys. for Engr.</td>
</tr>
<tr>
<td></td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>18</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

**JUNIOR YEAR**

<table>
<thead>
<tr>
<th>CrE 304 Exp. Design</th>
<th>CrE 302 Thermo, Chem. Cer</th>
</tr>
</thead>
<tbody>
<tr>
<td>CrE 306 Fuels, Comb. &amp; Heat</td>
<td>CrE 305 Res. Methods</td>
</tr>
<tr>
<td>Trans.</td>
<td>Ch 332 Physical Chemistry</td>
</tr>
<tr>
<td>CrE 307 Drying &amp; Firing</td>
<td>EE 308 Basic Elect. Engr.</td>
</tr>
<tr>
<td>Ch 331 Physical Chemistry</td>
<td>EE 310 Elect. Engr. Lab.</td>
</tr>
<tr>
<td>EE 307 Basic Elect. Engr.</td>
<td>EM 304 Mech. of Materials</td>
</tr>
<tr>
<td>EM 307 Dynamics</td>
<td>Approved Elective</td>
</tr>
<tr>
<td>Math 403 Statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>17</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

**SENIOR YEAR**

<table>
<thead>
<tr>
<th>CrE 403 Classes</th>
<th>CrE 402 Solid State Ceramics</th>
</tr>
</thead>
<tbody>
<tr>
<td>CrE 406 Cst. Project</td>
<td>CrE 407 Plant Design</td>
</tr>
<tr>
<td>Geol 406 Engr. Geol.</td>
<td>CrE 418 Process Control</td>
</tr>
<tr>
<td>IE 410 Engr. &amp; Organiz.</td>
<td>Geol 307 Optical Min.</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>Approved Electives</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>20</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

*Elective Policy.* Nine credits humanistic-social and 6 credits engineering-scientific must be chosen. Each class adviser has a list of approved electives.
CHEMICAL ENGINEERING

The graduate of the science-oriented, research-minded Chemical Engineering Department is finding intellectually stimulating and financially rewarding positions in all phases of modern industry. Because of the fundamental nature of the Chemical Engineering curriculum, the graduate is avidly sought by the newer nuclear and space-oriented industries, as well as by the equally important chemical-process industries. Indeed, the chemical engineer is in demand in areas of technology normally not thought to be associated with chemistry, e.g., textiles, metals, aircraft, power and instrumentation. The curriculum is built upon a base of three sciences (chemistry, physics, and mathematics) with supporting courses in mechanics, electrical engineering, and materials engineering and culminates in a solid core of courses in chemical engineering. In all such courses the emphasis is upon why things happen as they do and not how; thus, the student is taught principles that will endure and not the methods of the present or past. He is taught to realize that all material things are chemical in nature; hence, the chemical engineer in the practice of his profession may be called upon to work with anything on the face of the earth. The scope of chemical engineering is broad.

In spite of the strong scientific flavor of the Chemical Engineering curriculum, the faculty is constantly striving to impress upon the student that he is studying engineering and not pure science. The ultimate purpose of engineering is to make some practical use of scientific and engineering theories; hence, economics must always be kept in mind during the design of engineering processes or products. In brief, the chemical engineer in industry, as contrasted to the pure research scientist, is concerned that his company makes a profit.

In industry the chemical engineer may pursue one of two parallel lines of advancement. One path leads to management, and it should be noted that the top management of most chemical companies consists of former technical men. The second and equally rewarding path is in engineering research and development. In this latter category are found the men who have developed the processes and products which shape the modern world in which we live.

The Chemical Engineering Department at Clemson is housed in Earle Hall which is one of the newest and best equipped buildings for chemical engineering education in the Southeast. All members of the Chemical Engineering faculty have been educated at the
doctoral level and the department offers work leading to the Master of Science and Doctor of Philosophy degrees as well as the Bachelor of Science degree.

**CHEMICAL ENGINEERING MAJOR**

(See page 147 for *Freshman Year*)

<table>
<thead>
<tr>
<th><strong>Sophomore Year</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Semester</strong></td>
<td><strong>Second Semester</strong></td>
</tr>
<tr>
<td>Ch 323 Organic Chemistry</td>
<td>Ch 324 Org. Chem.</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>Math 207 Gen. Phys. for Engr.</td>
</tr>
<tr>
<td></td>
<td>Approved Electives</td>
</tr>
<tr>
<td><strong>Junior Year</strong></td>
<td></td>
</tr>
<tr>
<td>Ch 312 Anal. Chem.</td>
<td>ChE 306 Unit Operations</td>
</tr>
<tr>
<td>Ch 331 Phys. Chemistry</td>
<td>Ch 332 Phys. Chemistry</td>
</tr>
<tr>
<td>EM 306 Statics</td>
<td>EM 304 Mech. of Materials</td>
</tr>
<tr>
<td>Math 306 Diff. Equations</td>
<td>Approved Electives</td>
</tr>
<tr>
<td>Approved Technical Electives</td>
<td></td>
</tr>
<tr>
<td><strong>Senior Year</strong></td>
<td></td>
</tr>
<tr>
<td>ChE 401 Prin. Chem. Engr.</td>
<td>ChE 409 Plant Design</td>
</tr>
<tr>
<td>ChE 407 Unit Operations</td>
<td>ChE 412 Thesis</td>
</tr>
<tr>
<td>EE 307 Basic Elec. Engr.</td>
<td>MetE 502 Metallurgy</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>Approved Electives</td>
</tr>
</tbody>
</table>

Each class adviser has an up-to-date list of approved electives giving suggested course sequences, and students must select their electives from this list. A minimum of nine credits in the humanities or social sciences must be elected. Any exceptions to the list of approved electives must be approved in writing by the department head.

**CIVIL ENGINEERING**

Civil Engineering is the broadest in scope of the engineering professions, being the parent stem from which most of the other branches of engineering have developed. All branches of Civil Engineering rest on a comparatively compact body of principles, in which the students are thoroughly trained in the classroom, the drafting room, the laboratory, and the field. Particular effort is made to develop those qualities essential to success in any field of endeavor and to fit the graduate to become a useful citizen—a good business man as well as a successful engineer.

The course in Civil Engineering leads to the degree of Bachelor of Science in Civil Engineering. It is planned to equip the student with a working knowledge of those subjects which are fundamental in the field of civil engineering.
The curriculum for the first three years is the same for all Civil Engineering students. In the senior year each student may make limited selection of technical electives in order to specialize in areas of Civil Engineering, such as structures, construction, sanitary, or hydraulics. However, each option requires specific and related courses so chosen as to round out the student’s education in fundamentals and to qualify him to enter any branch of civil engineering which he chooses. The Civil Engineering graduate is prepared to work in practically all of the civil engineering fields, including surveying and mapping, design and construction of bridges, buildings, railways, highways, hydraulic, municipal and sanitary works.

A summer surveying camp is held on the campus during the regular summer school sessions, and all Civil Engineering students are required to attend at the end of their sophomore year.

In addition to the required technical studies, broadening training in the field of humanities is given.

CIVIL ENGINEERING MAJOR

(See page 147 for Freshman Year)

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 200 Elem. Survey</td>
<td>2 (1,3)</td>
</tr>
<tr>
<td>Econ 201 Prin. of Economics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>18</strong></td>
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</tbody>
</table>

SUMMER SURVEY CAMP

<table>
<thead>
<tr>
<th>JUNIOR YEAR</th>
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</thead>
<tbody>
<tr>
<td>CE 301 Surveying</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>Junior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM 303 Dynamics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>EM 304 Mech. of Mats.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>EM 305 Mech. of Mats. Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>Geol 406 Engr. Geology</td>
<td>3 (2,3)</td>
</tr>
<tr>
<td>Math 306 Diff. Equations</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Approved Non-Tech. Elective</td>
<td>3</td>
</tr>
<tr>
<td>Approved Tech. Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
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</table>

<table>
<thead>
<tr>
<th>SENIOR YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE 405 Environmental Engr.</td>
</tr>
<tr>
<td>CE 407 Struct. Design</td>
</tr>
<tr>
<td>CE 414 Soil Mechanics</td>
</tr>
<tr>
<td>CE 422 Engr. Relations</td>
</tr>
<tr>
<td>Approved Non-Tech. Elective</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Each class adviser has an up-to-date list of approved electives giving suggested course sequences, and students must select their electives from this list. Any exceptions to the list must be approved in writing by the department head.
ELECTRICAL ENGINEERING

Engineering deals fundamentally with the control of the energies of nature. Electrical Engineering is that branch of engineering which embraces the conversion of primary energy into electrical form, the application of this energy to perform useful work, and the study of electrical methods of carrying out sensing, control, and communication functions.

The curriculum for students in Electrical Engineering contains a selected series of fundamental studies which enable the student to enter any division of the field of Electrical Engineering. In addition, the curriculum includes a selected group of broadening and cultural studies.

The first two years are devoted largely to basic sciences, mathematics, English, and other subjects prerequisite to a study of engineering. In the last two years the courses, although still fundamental in nature, are based upon problems encountered in the various phases of electrical engineering. A limited degree of specialization in power or electronics work is possible.

The theoretical courses in science and engineering are paralleled and reinforced by strong laboratory courses, through which the student may make his own determinations of the characteristics of engineering materials and machines and other electrical devices. The laboratories are well equipped for this work.

The entire course is directed toward the development of initiative and self-reliance, so that the student may enter his chosen field with reasonable hope of usefulness and success.

Any questions regarding scheduling or electives for those concerned with the transition between curriculums should be taken up with the appropriate class advisers.

ELECTRICAL ENGINEERING MAJOR
(See page 147 for Freshman Year)

<table>
<thead>
<tr>
<th>Sophomore Year</th>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ 201 Prin. of Economics</td>
<td>3 (3,0)</td>
<td>EE 214 Elec. Cir. &amp; Fields</td>
</tr>
<tr>
<td>Engl 203 Survey of Eng. Lit.</td>
<td>3 (3,0)</td>
<td>EM 306 Statics</td>
</tr>
<tr>
<td>Math 203 Anal. Geom., Cal. II</td>
<td>4 (4,0)</td>
<td>Engl 204 Survey of Eng. and Amer. Lit.</td>
</tr>
<tr>
<td>Phys 213 Gen. Phys. Lab.</td>
<td>1 (0,3)</td>
<td>Phys 212 Gen. Phys. for Engr.</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
<td>Phys 214 Gen. Phys. Lab.</td>
</tr>
<tr>
<td><strong>16</strong></td>
<td></td>
<td>AS or MS—Basic</td>
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</table>
### First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EE 313 Elect. &amp; Mag. Fields</td>
<td>2 (2.0)</td>
</tr>
<tr>
<td>EE 315 A. C. Circuits</td>
<td>4 (3.3)</td>
</tr>
<tr>
<td>EE 317 Measurements Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>EM 307 Dynamics</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Math 306 Ord. Diff. Equations</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ME 302 Elem. Thermodynamics</td>
<td>3 (3.0)</td>
</tr>
</tbody>
</table>

**Junior Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 312 Elec. Mach. I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>EE 314 Elec. Mach I Lab.</td>
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</tr>
<tr>
<td>EE 316 A. C. Circuits</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>EE 320 Electronics I</td>
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</tr>
<tr>
<td>EE 322 Electronics I Lab.</td>
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</tr>
<tr>
<td>EM 304 Mech. of Materials</td>
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</tr>
<tr>
<td>ME 304 Heat Transfer I</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>ME 307 Mech. Engr. Lab.</td>
<td>1 (0.3)</td>
</tr>
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**Second Semester**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 401 Seminar</td>
<td>1 (1.0)</td>
</tr>
<tr>
<td>EE 407 Electronics II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>EE 409 Electronics II Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>EE 415 Adv. Circuits</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>EE 417 Elect. Mach. II</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>EE 419 Elect. Mach. II Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Hist 301 U. S. Since 1865</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Approved Electives*</td>
<td>4</td>
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</table>

**Senior Year**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 402 Engr. Analysis</td>
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</tr>
<tr>
<td>EE 410 Feedback Cont. Syst.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>IE 410 Engr. and Org.†</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Approved Electives*</td>
<td>13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 422 or IE 404</td>
<td>20</td>
</tr>
</tbody>
</table>

* Each class adviser has an up-to-date list of approved electives and students must select their electives from this list. Any exceptions to this list must be approved in writing by the department head.

**Advanced ROTC or AFROTC:** Six credits of advanced ROTC or AFROTC and at least three credits in EE. The other credits may be any approved general or technical electives, but may not be advanced ROTC or AFROTC.

**Non-ROTC:** At least three credits in EE electives and at least six credits in approved general electives.

† CE 422 or IE 404 may be substituted for IE 410 if necessary.

## INDUSTRIAL EDUCATION

The curriculum in Industrial Education has as its primary objective the preparation of students to teach a wide variety of industrial subjects. These derive their purpose from needs which the expanding industry of South Carolina and the Southeastern region demand of the industrial education teacher. Some of the subjects which these teachers are required to teach include: drawing, woodworking, metal forming, machine shop, ceramics, plastics, textiles, electricity, auto mechanics, home mechanics, etc.

The curriculum is designed to provide the student with depth of understanding to meet the above and related demands. Industrial Education and related technical core work is coupled with studies in other areas as follows: (1) Physics and Chemistry, 16 credit hours; (2) Mathematics, 14; (3) Biological Science, 4; (4) Social Sciences, 15; and (5) English, Literature, and Arts, 15.

Industrial Education laboratory courses are conducted in one of the best equipped facilities in the country.

Employment opportunities for the graduate in Industrial Education are reflected in the increasing demand for teachers of industrial subjects. In South Carolina, for example, present demand greatly exceeds the supply of qualified teachers.

Graduates are qualified to teach related sciences, mathematics, industrial arts, and to serve as supervisors of Industrial Education.
programs in the public schools and in industries. Although the primary purpose of this curriculum is teaching in the technical field of Industrial Education, opportunities in other careers are available. Clemson can point with pride to the positions of leadership held by its Industrial Education graduates in other fields of endeavor.

**INDUSTRIAL EDUCATION MAJOR**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch 101 General Chemistry</td>
<td>Ch 102 General Chemistry</td>
</tr>
<tr>
<td>Hist 101 American History</td>
<td>Hist 102 American History</td>
</tr>
<tr>
<td>Math 105 Alg. and Trig.</td>
<td>Math 106 Analyt. Geom., Cal. 1</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sophomore Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Ed 201 In. Ed. Lab.</td>
</tr>
<tr>
<td>Math 200 Anal. Geom., Calculus</td>
</tr>
<tr>
<td>Zool 101, 103 Gen. Zoology</td>
</tr>
<tr>
<td>or Bot 101 Gen. Botany</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Junior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ed 302 Educational Psychology</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
</tr>
<tr>
<td>In Ed 301 In. Ed. Lab.</td>
</tr>
<tr>
<td>In Ed 302 Dwelling Mat. &amp;</td>
</tr>
<tr>
<td>Const. Meth.</td>
</tr>
<tr>
<td>Approved Elective</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Senior Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ed 406 Hist. &amp; Phil. of Educ.</td>
</tr>
<tr>
<td>In Ed 401 In. Ed. Lab.</td>
</tr>
<tr>
<td>In Ed 406 Tests and Measures in</td>
</tr>
<tr>
<td>In. Ed.</td>
</tr>
<tr>
<td>In Ed 416 Design and Oper. of</td>
</tr>
<tr>
<td>In. Ed. Lab.</td>
</tr>
<tr>
<td>In Ed 422 Voc. Ed. Programs</td>
</tr>
<tr>
<td>In Ed 425 Teach In. Subj.</td>
</tr>
</tbody>
</table>

* Required for Teacher Certification.

Each class adviser has an up-to-date list of approved electives giving suggested course sequences, and students must select their elective from this list. Any exception to the list must be approved in writing by the department head.

**INDUSTRIAL ENGINEERING**

The creative and challenging work of the Industrial Engineer lies in the field of manufacturing. He designs the manufacturing processes that produce the innumerable goods we see about us, such as automobiles, radios, cloth and clothes, chairs, typewriters, airplanes, textile machines, lights, pencils, books, boats, bicycles, etc. To create production systems for products which may require only
a small area to those covering many acres the Industrial Engineer must do planning of many kinds. He plans: (1) the basic processes to be used, such as machining, casting, welding, stamping, forging, molding, sewing, painting, assembling, etc.; (2) the machines to be used; (3) the arrangement of work stations; (4) the time standards for the job; (5) the selection and layout of all the machines and equipment; (6) the materials handling methods and equipment; (7) the degree of mechanization or automation of a process; (8) the special tooling, such as dies, jigs, and fixtures; (9) the scheduling of flow of work so that the right quantity of material is at the right place at the right time; (10) the methods of inspection and quality control; and (11) the methods for controlling costs. In search for the most efficient methods the Industrial Engineer must, with the aid of research and development studies, create many alternatives and then subject each to critical economic analysis. The physical result of his design efforts is the complex production system found within the factory walls.

Because Industrial Engineers find employment in all types of manufacture, the curriculum at Clemson is predicated upon providing the best possible grounding in the fundamentals of science and engineering. The curriculum includes a strong core of basic science, engineering science, and mathematics courses in seven of the eight semesters. Their application to Industrial Engineering is carried through a series of carefully integrated courses. Classroom work is implemented by experimental studies in one of the best equipped laboratories of its kind in the country.

Excellent opportunities for industrial employment, graduate studies, and in college teaching are open to the Industrial Engineer everywhere.

The graduate who prefers employment in the Southeast region will find excellent opportunity in a vast textile industry and in the rapidly growing numbers of manufacturing plants producing products of metals, plastics, glass, paper, rubber, wood, etc. Because he develops a breadth of understanding of manufacturing organization and operation, supervisory and management positions provide additional opportunity for him.
## INDUSTRIAL ENGINEERING MAJOR

(See page 147 for Freshman Year)

### First Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ 201 Prin. of Economics</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td>IE 201 Mfg. Processes</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>or CE 200 Elem. Surveying</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>Math 205 Anal. Geom., Cal. II</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>Phys 211 Gen. Phys. for Engr.</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>Phys 213 Gen. Phys. Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2.1)</td>
</tr>
</tbody>
</table>

**Total Credits:** 18

### Second Semester

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CE 200 Elem. Surveying</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>or IE 201 Mfg. Processes</td>
<td>2 (1.3)</td>
</tr>
<tr>
<td>EM 306 Statics</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Engl 204 Survey of Engl. and Amer. Lit.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Math 206 Anal. Geom., Cal. III</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>Phys 212 Gen. Phys. for Engr.</td>
<td>4 (4.0)</td>
</tr>
<tr>
<td>Phys 214 Gen. Phys. Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2.1)</td>
</tr>
</tbody>
</table>

**Total Credits:** 18

### Junior Year

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>EM 307 Dynamics</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td>IE 301 Introd. Ind. Engr.</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td>IE 304 Motion &amp; Time Study</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Math 306 Diff. Equations</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td>ME 302 Elem. Thermodynamics</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td>MetE 302 Metallurgy</td>
<td>3 (5.0)</td>
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</tbody>
</table>

**Total Credits:** 18

### Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 307 Basic Elect. Engr.</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td>EE 309 Elect. Engr. Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>EM 401 Fluid Mech.</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td>Engl 301 Public Speaking</td>
<td>3 (5.0)</td>
</tr>
<tr>
<td>IE 401 Process Anal. &amp; Control</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>IE 403 Process Fund.</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Approved Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits:** 19

### Approved Elective

Each class adviser has an up-to-date list of approved electives giving suggested course sequences. Students must select their electives from this list. Any exceptions to list must be approved in writing by the department head.

## MECHANICAL ENGINEERING

Mechanical Engineering deals largely with the production of power from prime sources of energy and the design of a wide variety of mechanisms and systems involved in the production and use of power.

The curriculum for students in Mechanical Engineering follows a sequence beginning with the basic sciences of mathematics, physics and chemistry, continuing through the engineering sciences of thermodynamics, mechanics of solids and fluids, strength of materials, electrical theory, and metallurgy, and ending with synthesis type courses designed to require the student to draw on his entire engineering and technological background.

The economic aspects of engineering are emphasized as much as possible, and the program is conducted so as to encourage orderly habits of attack and analysis, with the main emphasis on why rather than how. Students are encouraged to develop a broad background along with their scientific and engineering training, and humanistic-social courses are an important part of the curriculum.
Mechanical Engineering graduates work with the production and application of power, in research, and in design, development, construction and application of machines, as well as in management.

MECHANICAL ENGINEERING MAJOR
(See page 147 for Freshman Year)

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Sophomore Year</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ 201 Prin. of Economics</td>
<td>3 (3,0)</td>
<td>EM 306 Statics</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3 (3,0)</td>
<td>Engl 204 Survey of Engl. and Amer. Lit.</td>
</tr>
<tr>
<td>Math 205 Anal. Geom., Cal. II</td>
<td>4 (4,0)</td>
<td>ME 214 Engr. Problems</td>
</tr>
<tr>
<td>Phys 211 Gen. Phys. for Engr.</td>
<td>4 (4,0)</td>
<td>or IE 201 Mfg. Processes</td>
</tr>
<tr>
<td>Phys 213 Gen. Phys. Lab.</td>
<td>1 (0,3)</td>
<td>Phys 212 Gen. Phys. for Engr.</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
<td>1 (2,1)</td>
<td>Phys 214 Gen. Phys. Lab.</td>
</tr>
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</table>

18 or 17

JUNIOR YEAR

<table>
<thead>
<tr>
<th>Junior Year</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>EE 307 Basic Elect. Engr.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>EE 309 Elect. Engr. Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>EM 304 Mechanics of Matls.</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>EM 305 Mech. of Matls. Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>EM 307 Engr. Mechanics</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Math 306 Ord. Diff. Equations</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>ME 311 Engr. Thermo. I</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>ME 313 Inst. &amp; Meas.</td>
<td>1 (0,5)</td>
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18

SENIOR YEAR

<table>
<thead>
<tr>
<th>Senior Year</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 401 Machine Design</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>ME 405 Seminar</td>
<td>1 (1,0)</td>
</tr>
<tr>
<td>ME 413 ME Lab.</td>
<td>1 (0,3)</td>
</tr>
<tr>
<td>ME 424 Engr. Analysis</td>
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<tr>
<td>ME Senior Option</td>
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<tr>
<td>MetE 302 Gen. Metallurgy</td>
<td>3 (3,0)</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

19

ME SENIOR OPTION. Twelve credits must be taken from the following group:

| ME 403 Gas Dynamics | 3 (3,0) |
| ME 404 Automatic Control Engineering | 3 (3,0) |
| ME 407 Heat Transfer II | 3 (3,0) |
| ME 411 Gas Power | 3 (3,0) |
| ME 412 Steam Power | 3 (3,0) |
| ME 422 Prin. of Turbomachinery | 3 (3,0) |
| ME 429 Air Conditioning | 3 (3,0) |
| ME 433 Elem. Aerodynamics | 3 (3,0) |

Elective Policy. Six credits humanistic-social and six credits engineering-scientific must be chosen. Each class adviser has a list of approved electives.

METALLURGICAL ENGINEERING

The metallurgical engineer is concerned with the extraction of metals from their ores and with the processing of these metals to useful engineering materials. He needs a sound and thorough knowledge of chemistry, physics, and mathematics as the core around which to build his specialty. He needs training in English and foreign languages so that he may communicate his knowledge and understand what his colleagues are doing. He requires training in the humanities that he may be a good citizen. His grandfather
Metallurgical Engineering 159

got along with about fifteen elemental metals; he must know and use seventy-five or more. Our engineering requirements are becoming more exacting, and our opportunities to fill them greater. Nuclear fission has greatly expanded the field of metallurgical knowledge and has required much of metallurgy, as has supersonic flight and our space exploration program. There is still room for much progress in the less spectacular areas, as in the production of cast metal parts, in heat treating, and in the intelligent selection of metals for all engineering applications.

The industrial growth of the South presents many opportunities in metallurgical work; in the production of metals, in the processing of metals, and in the sale of metals. Until very recently there has been no opportunity for adequate metallurgical training in the South. Thanks to a generous gift from the Olin Foundation, Clemson College is in a unique position to offer training with the best of laboratory facilities and equipment.

**METALLURGICAL ENGINEERING MAJOR**
*(See page 147 for Freshman Year)*

<table>
<thead>
<tr>
<th><em>First Semester</em></th>
<th><em>Second Semester</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sophomore Year</strong></td>
<td><strong>Junior Year</strong></td>
</tr>
<tr>
<td><strong>Senior Year</strong></td>
<td><strong>MetE 308 Physical Met.</strong></td>
</tr>
<tr>
<td><strong>MetE 309 Physical Met.</strong></td>
<td><strong>MetE 320 Mechanical Met.</strong></td>
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<td><strong>Electives</strong></td>
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**Third Semester**

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<tr>
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<td><strong>MetE 309 Physical Met.</strong></td>
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<tr>
<td><strong>MetE 320 Mechanical Met.</strong></td>
<td><strong>MetE 320 Mechanical Met.</strong></td>
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<tr>
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**Fourth Semester**

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<td><strong>MetE 309 Physical Met.</strong></td>
<td><strong>MetE 309 Physical Met.</strong></td>
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<td><strong>MetE 320 Mechanical Met.</strong></td>
<td><strong>MetE 320 Mechanical Met.</strong></td>
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<td><strong>Electives</strong></td>
<td><strong>Electives</strong></td>
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</table>
SCHOOL OF INDUSTRIAL MANAGEMENT AND TEXTILE SCIENCE

The School of Industrial Management and Textile Science is based on the industrialization of the South, business conversions from small independents to large complexes, new sciences and techniques and the ever-growing demand for reduced costs. It is set up to help fill the ever-growing demand for young men educated in the field of scientific management, both in general and specialized fields.

Since World War II South Carolina has been immersed with new industries—plastics, chemicals, home appliances, glass, furniture, and paper. During this time textiles has maintained its relative position of importance in the State. It continues to be twice as large as all other industries combined.

This industrialization of the South has brought a diversified and complicated production era which demands a greater supply of top quality managerial prospects.

INDUSTRIAL MANAGEMENT

The curriculum in Industrial Management is offered for those students who plan to follow a career associated with industry or business. The curriculum constitutes a program of basic professional education designed to prepare students for eventual managerial and administrative positions in manufacturing and commerce, or careers in the general field of business. In keeping with the increasing demands by industry for students equipped with a well-rounded education, during the first two years, training in the humanities, social, and physical sciences is emphasized. During the junior and senior years the student concentrates on various basic engineering, business, economic, and technical courses designed to furnish a balanced curriculum for those entering the fields of business or industry.

INDUSTRIAL MANAGEMENT MAJOR

<table>
<thead>
<tr>
<th>First Semester</th>
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<tbody>
<tr>
<td>Ch 101 General Chemistry</td>
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<tr>
<td>EG 105 Engr. Graphics</td>
</tr>
<tr>
<td>Engl 101 Engl. Composition</td>
</tr>
<tr>
<td>Hist 101 American History</td>
</tr>
<tr>
<td>Math 105 Algebra and Trig.</td>
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<td>AS or MS—Basic</td>
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<tbody>
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<td>Ch 102 General Chemistry</td>
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<tr>
<td>EC 106 Engr. Graphics</td>
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<td>Engl 102 Engl. Composition</td>
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<tr>
<td>Hist 102 American History</td>
</tr>
<tr>
<td>Math 106 Anal. Geom., Cal. I</td>
</tr>
<tr>
<td>AS or MS—Basic</td>
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</tbody>
</table>

17 17
**Elective Course Areas for Emphasis**

During the junior and senior years the student is required to select courses from one of the following areas for the purpose of emphasizing a particular phase of the curriculum. This constitutes 12 credits.

- **A. Agricultural Economics**
- **B. Ceramics**
- **C. Economics**
- **D. Finance**
- **E. Foreign Language**
- **F. Regional Analysis**
- **G. Textile Chemistry**
- **H. Textiles**

The student must select an additional 6 elective credits approved by his class adviser or the Dean of the School of Industrial Management and Textile Science. Students enrolled in the advanced ROTC program may use 6 credits of advanced military courses to meet this requirement.

**TEXTILE CHEMISTRY**

The Textile Chemistry curriculum is a well-rounded educational program especially strong in requirements in English. It is planned to give the students thorough preparation in basic chemistry in addition to textile chemistry, general textile and managerial subjects. Graduates of this curriculum are largely employed in administrative and research positions in finishing plants and synthetic fiber plants as well as in dyestuff and chemical organizations. Many who graduate in this major continue their education through the master’s and doctor’s degrees.
## TEXTILE CHEMISTRY MAJOR

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Freshman Year</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>Ch 101 General Chemistry</td>
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<td>Ch 102 General Chemistry</td>
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<tr>
<td>EG 105 Engr. Graphics</td>
<td>2 (0.6)</td>
<td>EG 106 Engr. Graphics</td>
</tr>
<tr>
<td>Engl 101 Eng. Composition</td>
<td>3 (3.0)</td>
<td>Engl 102 Eng. Composition</td>
</tr>
<tr>
<td>Math 105 Algebra and Trig.</td>
<td>4 (4.0)</td>
<td>TM 101 Intro. to Text.</td>
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<tr>
<td>AS or MS—Basic</td>
<td>1 (2.1)</td>
<td>AS or MS—Basic</td>
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<thead>
<tr>
<th>Sophomore Year</th>
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<tbody>
<tr>
<td>Ch 219 Chem. Prin.</td>
<td>2 (2.0)</td>
<td>Econ 201 Prin. of Economics</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
<td>3 (3.0)</td>
<td>Engl 204 Survey of Engl. and Amer. Lit.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>Math 205 Anal. Geom., Cal. II</td>
<td>4 (4.0)</td>
<td>Hist 104 Hist. of Civilization</td>
<td>3 (3.0)</td>
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<tr>
<td>Phys 203 Gen. Physics Lab</td>
<td>1 (0.3)</td>
<td>Phys 202 Gen. Physics</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>WD 221 Fab. Design</td>
<td>3 (2.3)</td>
<td>Phys 204 Gen. Physics Lab</td>
<td>1 (0.3)</td>
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<td>AS or MS—Basic</td>
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<td>AS or MS—Basic</td>
<td>1 (2.1)</td>
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<th>Junior Year</th>
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<tbody>
<tr>
<td>Ch 331 Phys. Chem.</td>
<td>3 (3.0)</td>
<td>Ch 316 Quan. Analysis</td>
<td>5 (3.6)</td>
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<tr>
<td>Engl 301 Public Speaking</td>
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<td>Ch 332 Phys. Chemistry</td>
<td>3 (3.0)</td>
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<tr>
<td>TC 305 Text. Chem.</td>
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<td>TC 306 Text. Chemistry</td>
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<td>TC 307 Text. Chem. Lab</td>
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<td>TC 308 Text. Chemistry Lab.</td>
<td>1 (0.3)</td>
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<tr>
<td>TM 462 Text. Micros.</td>
<td>2 (1.3)</td>
<td>TM 302 Text. Qual. Cont.</td>
<td>3 (3.0)</td>
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<td>TM 301 Text. Qual. Control</td>
<td>3 (3.0)</td>
<td>Approved Elective</td>
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<tr>
<td>Tm 454 Mot. &amp; Time Study</td>
<td>3 (2.3)</td>
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<tr>
<th>Senior Year</th>
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<tbody>
<tr>
<td>Econ 301 Labor Problems</td>
<td>3 (3.0)</td>
<td>TC 440 Text. Finishing</td>
<td>3 (1.6)</td>
</tr>
<tr>
<td>Engl 304 Adv. Composition</td>
<td>3 (3.0)</td>
<td>TC 456 Syn. Fib. &amp; Finishing</td>
<td>3 (3.0)</td>
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<tr>
<td>TC 442 Thesis</td>
<td>2 (0.6)</td>
<td>TC 462 Chem. Proc. Text.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>TC 447 Chem. Proc. Text.</td>
<td>3 (3.0)</td>
<td>TC 464 Chem. Proc. Lab.</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>TC 449 Chem. Proc. Text. Lab.</td>
<td>1 (0.3)</td>
<td>TM 403 Text. Mgt.</td>
<td>3 (3.0)</td>
</tr>
<tr>
<td>TC 475 Cellulose Chem.</td>
<td>2 (2.0)</td>
<td>TM 464 Phys. Text. Test.</td>
<td>2 (1.3)</td>
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<td>TM 468 Seminar</td>
<td>1 (1.0)</td>
<td>Approved Elective</td>
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<tr>
<td>Approved Elective</td>
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<td><strong>19</strong></td>
<td>18</td>
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</tbody>
</table>

*Approved Electives:
- Econ 202, Social Sciences and English on the junior and senior levels that do not duplicate required subjects.
- Textile courses, physics, chemistry and mathematics beyond those required.
- Ag Ec 352—Public Finance.
- IM 307—Personnel Management.
- Music 310—Music Appreciation.
- AS and MS—Advanced.

## TEXTILE MANAGEMENT

The Textile Management curriculum is planned to give adequate training in the textile technological and managerial subjects. An unusually strong program is offered in English, including courses in public speaking and technical report writing. The basic sciences are taken care of, including some organic chemistry. The chief outside emphasis is on the social sciences.

The Management curriculum is designed for the student whose interest is in the field of human relations. The strong program in the social sciences emphasizes this.
## TEXTILE MANAGEMENT MAJOR

### Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>Ch 101 General Chemistry</td>
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<td>Math 105 Algebra and Trig.</td>
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<tr>
<td>AS or MS—Basic</td>
<td>AS or MS—Basic</td>
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<tr>
<td>Econ 201 Prin. of Economics</td>
<td>Econ 202 Prin. of Economics</td>
</tr>
<tr>
<td>Hist 104 Western Civilization</td>
<td>Amer. Lit.</td>
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<tr>
<td>WD 225 Loom Mechanism</td>
<td>WD 221 Fabric Design</td>
</tr>
<tr>
<td>YM 221 Opening and Blending</td>
<td>YM 222 Cleaning</td>
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<tr>
<td>AS or MS—Basic</td>
<td>AS or MS—Basic</td>
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### Sophomore Year

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<th>JUNIOR YEAR</th>
<th>SENIOR YEAR</th>
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<tbody>
<tr>
<td>Engl 301 Public Speaking</td>
<td>Engl 304 Adv. Composition</td>
</tr>
<tr>
<td>TC 321 Textile Chemistry</td>
<td>Psych 301 Gen. Psychology</td>
</tr>
<tr>
<td>TC 323 Textile Chem. Lab.</td>
<td>TC 451 Color Applied to Text.</td>
</tr>
<tr>
<td>TM 301 Textile Quality Control</td>
<td>TC 453 Textile Chem. Lab.</td>
</tr>
<tr>
<td>WD 301 Feb. Struct. &amp; Design</td>
<td>TM 403 Textile Management</td>
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<tr>
<td>WD 309 Knitting</td>
<td>TM 405 Textile Costing</td>
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<tr>
<td>YM 321 Draft., Twist. &amp; Wind. (I)</td>
<td>WD 401 Warp Preparation</td>
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<td>Soc 301 Sociology</td>
<td>Econ 301 Labor Problems</td>
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<td>TC 322 Chem. Proc. Text.</td>
<td>TM 407 Textile Costing</td>
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<td>TC 324 Textile Chemistry Lab.</td>
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<td>TM 302 Textile Quality Control</td>
<td>TM 462 Textile Microscopy</td>
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<tr>
<td>YM 322 Draft., Twist. &amp; Wind. (II)</td>
<td>TM 465 Seminar</td>
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<tr>
<td>WM 402 Fabric Development</td>
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### Approved Electives:
- Social Sciences and English on the junior and senior levels that do not duplicate required subjects.
- Textile courses, physics, chemistry, and mathematics beyond those required.
- Ag Ec 352—Public Finance.
- IM 307—Personnel Management.
- AS and MS—Advanced.

## TEXTILE SCIENCE

In the Textile Science curriculum the emphasis is on the basic sciences of mathematics, physics, and chemistry. These three subjects make up about 40 per cent of the curriculum.

The textile technological and managerial courses are ample and the English is the same as most curriculums in the College.

The Textile Science curriculum is especially designed for the student with scientific leanings. It prepares him for research and development work as well as for positions in production and standards. It has a very strong foundation for a graduate school program.
### Textile Science Major

#### Freshman Year

<table>
<thead>
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<td>Engl 101 Eng. Composition</td>
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<td>Gov 101 Am. Natl. Govt.</td>
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<td>Math 105 Algebra and Trig.</td>
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<td>Ch 102 General Chemistry</td>
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<td>EG 106 Engr. Graphics</td>
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### Sophomore Year

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<tbody>
<tr>
<td>Engl 203 Survey of Engl. Lit.</td>
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<td>Math 205 Anal. Geom., Cal. II</td>
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<td>Phys 211 Gen. Phys. for Engr.</td>
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<tr>
<td>Phys 213 Gen. Phys. Lab.</td>
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<tr>
<td>WD 225 Loom Mechanism</td>
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<td>YM 221 Opening &amp; Blending</td>
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<tr>
<td>Engl 204 Survey of Engl. and Amer. Lit.</td>
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<td>Math 206 Anal. Geom., Cal. III</td>
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<td>Phys 212 Gen. Phys. for Engr.</td>
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<td>Phys 214 Gen. Phys. Lab.</td>
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### Junior Year

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<td>Econ 201 Prin. of Economics</td>
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<td>TC 305 Textile Chemistry</td>
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<tr>
<td>TC 307 Textile Chem. Lab.</td>
</tr>
<tr>
<td>TM 301 Textile Quality Control</td>
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<tr>
<td>WD 221 Fabric Design</td>
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<tr>
<td>YM 321 Draft., Twist, &amp; Wind. (I)</td>
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<tbody>
<tr>
<td>Science Option†</td>
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<tr>
<td>TC 306 Textile Chemistry</td>
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<tr>
<td>TC 308 Textile Chemistry Lab.</td>
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<td>TM 302 Textile Quality Control</td>
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<tr>
<td>WD 309 Knitting</td>
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<td>YM 322 Draft., Twist, &amp; Wind. (II)</td>
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### Senior Year

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<td>TC 421 Color Applied to Textiles</td>
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<tr>
<td>TC 423 Textile Chem. Lab.</td>
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<tr>
<td>TM 403 Textile Management</td>
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<tr>
<td>TM 405 Textile Costing</td>
</tr>
<tr>
<td>WD 301 Fab. Struct. &amp; Design</td>
</tr>
<tr>
<td>WD 401 Warp Preparation</td>
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<td>Approved Elective*</td>
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<tr>
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<tbody>
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<td>Eng 301 Public Speaking</td>
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<tr>
<td>Science Option†</td>
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<tr>
<td>TM 407 Textile Costing</td>
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<td>TM 454 Motion and Time Study</td>
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<td>TM 462 Textile Microscopy</td>
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<td>TM 464 Physical Textile Test.</td>
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<tr>
<td>TM 468 Seminar</td>
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<tr>
<td>Approved Elective*</td>
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* Approved Electives:
  Econ 201 and Econ 202. Social Sciences and English on the junior and senior levels that do not duplicate required subjects.
  Textile courses, physics, chemistry, and mathematics beyond those required.
  Ag: Ec 352—Public Finance.
  IM 307—Personnel Management.
  Music 310—Music Appreciation.
  AS and MS—Advanced.

† Mathematics or physics to be approved by the class adviser and certified to the Director of Admissions and Registration.
DESCRIPTION OF COURSES

This list of courses includes for each course the catalog number, title of course, credit in semester hours, class laboratory hours per week, and the description of the course. In general, courses numbered 100-199 are freshman courses, 200-299 sophomore courses, 300-399 junior courses, and 400-499 senior courses. Courses numbered 500 or above are graduate courses and are open only to students admitted to the Graduate School.

ACCOUNTING

Mr. Trevillian
Mr. Davis, Mr. Edel, Mr. Scott

Acct 201—Principles of Accounting—3 cr. (3 and 0)
Practice in handling real and nominal accounts, together with an introduction to the use of various types of books of original entry, statements of profit and loss, and balance sheets. The work of this course consists of lectures and problems.

Acct 202—Principles of Accounting—3 cr. (3 and 0)
Continuation of Acct 201 with special attention to corporation and partnership accounting with emphasis on adjustment procedures and the analysis of financial statements. Prerequisite: Acct 201.

AGRICULTURAL ECONOMICS

Mr. Aull
Mr. Stepp, Mr. Bauknight, Mr. Spurlock, Mr. Steele, Mr. Todd

Ag Ec 202—Agricultural Economics—3 cr. (3 and 0)
An analytical survey of the various subdivisions of agricultural economics, to include farm organization, enterprise analysis, land economics, marketing, farm prices, governmental farm policies, and the relation of agriculture to the national and international economy. Prerequisite: Econ 201.

Ag Ec 302—Farm Management—3 cr. (2 and 3)
Business principles underlying the organization and operation of individual farms. Such factors as proper balance between enterprises and use of sound economic principles are considered from the viewpoint of continuous profits. Prerequisite: Econ 201.

Ag Ec 305—Farm Accounting—3 cr. (2 and 3)
Double-entry bookkeeping is stressed in the foundation of this course. Study is then made of special journals, simplifications for farm record keeping, farm inventories, farm budgets, interpretation of financial statements, and the factor method of farm business analysis.

Ag Ec 309—Introduction to Marketing—3 cr. (3 and 0)
A general introduction to the field of marketing with emphasis on marketing functions, institutions and channels of distribution. Special emphasis is given to recent changes and developments in marketing policies and practices. Other subjects covered include objectives and uses of marketing research, product
design, brand policy, and pricing. Attention is given to industrial products as well as agricultural commodities. Prerequisite: Econ 201.

Ag Ec 352—Public Finance—3 cr. (3 and 0)
Principles of financing government, sources of public revenue, objects of public expenditures, problems of fiscal administration, and the application of fiscal policies in stabilizing the national economy.

Ag Ec 357—Conservation of Natural Resources—3 cr. (3 and 0)
A study of the principles and problems involved in the conservation of soil, water, and mineral resources, with special emphasis on economic aspects of various methods of resource utilization and on the costs and benefits of various conservation practices. Prerequisite: Econ 201.

Ag Ec 361—Marketing Livestock and Livestock Products—3 cr. (3 and 0)
Steps and conditions attending the marketing of livestock and dairy products are considered. Included are selling methods; factors affecting price, production and utilization of meats; fluid milk and other dairy products; practices of buyers and packers; activities of state and federal governments; pricing policies and price determination; market news services; and psychology and preferences of consumers. Prerequisite: Junior standing.

Ag Ec 405—Seminar—1 cr. (1 and 0)
An examination of the relation of economics and sociology to specific problems. Prerequisite: Major in Agricultural Economics.

Ag Ec 406—Seminar—1 cr. (1 and 0)
A continuation of Ag Ec 405.

Ag Ec 451—Agricultural Cooperation—2 cr. (2 and 0)
The principles and practices of business organization and management governing the successful operation of cooperative business enterprises. Major emphasis is placed upon cooperative selling, processing, purchasing, and service enterprises that serve farm people. Prerequisite: Econ 201.

Ag Ec 452—Agricultural Policy—3 cr. (3 and 0)
A critical examination of government policies and programs affecting agriculture.

Ag Ec 456—Prices—3 cr. (3 and 0)
A review of the basic theory of price under competitive conditions and various modifications; nature, measurement and causes of daily, seasonal and cyclical price fluctuations; geographical price relationships; nature, function and behavior of futures markets; government price programs. Prerequisite: Econ 201 and permission of instructor.

Ag Ec 460—Agricultural Finance—2 cr. (2 and 0)
A critical study of the financial needs of agriculture and of the organization, functions and interrelationships of agencies developed to meet these needs. Prerequisite: Econ 201.

Ag Ec 501—Advanced Farm Management—3 cr. (2 and 3)
Ag Ec 503—Land Economics—3 cr. (3 and 0)
Ag Ec 504—Water Resource Policies—3 cr. (3 and 0)
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<td>Ag Ec 691</td>
<td>Doctoral Research and Dissertation</td>
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**AGRICULTURAL EDUCATION**

Mr. Davis

Mr. Bowen, Mr. Kirkley, Mr. Rodgers

**Ag Ed 201—Introduction to Education**—3 cr. (2 and 3)

Principles of education, development of agricultural education, and an introduction to the formulation of instructional programs for the teaching of farm people by vocational agricultural teachers.

**Ag Ed 401—Methods in Agricultural Education**—3 cr. (2 and 3)

A study of appropriate methods of teaching vocational agriculture in high schools. The course includes procedures for organizing teaching programs, teaching high school students, and directing F.F.A. activities.

**Ag Ed 406—Directed Teaching**—6 cr. (0 and 18)

Guided participation in the professional responsibilities of a teacher of vocational agriculture including an intensive study of the problems encountered and the competencies developed. Only half semester of directed teaching in selected schools is required. **Prerequisite:** Ag Ed 401 and Ag Ed 422.

**Ag Ed 422—Introduction to Adult Education**—3 cr. (2 and 3)

History, scope and kinds of adult education in the United States, with emphasis placed on adult education for rural people. Also included are general methods of teaching adults, procuring teaching materials, and planning lessons based on farm problems.

**Ag Ed 431—Methods in Conservation Education**—3 cr. (3 and 0)

In this course teachers and student teachers study various techniques appropriate to teaching conservation. Instruction is applicable to both elementary and high school teachers. **(Offered in Summer School only.)**

**Ag Ed 463—Advanced Conservation Education**—3 cr. (3 and 0)

The broader aspects of conservation education. The course includes historical, geographical, and national conservation problems. It will be of special interest to those dealing directly with conservation problems. **(Offered in Summer School only.)**
Ag Ed 465—Program Development in Agricultural Education—3 cr. (3 and 0)
Each student will determine needs and resources in a specific community and plan a program to meet these needs based upon appropriate and accepted procedures and principles.

Ag Ed 467—Adult Education in Agriculture—3 cr. (2 and 3)
Principles and practices appropriate to the solution of problems encountered in instructional programs for adult farmers. Prerequisite: Experience in agricultural education or consent of the instructor.

Ag Ed 503—Evaluation in Agricultural Education—3 cr. (2 and 3)
Ag Ed 504—Special Problems—3 cr. (2 and 3)
Ag Ed 505—Administration and Supervision in Agricultural Education—3 cr. (3 and 0)
Ag Ed 515—Advanced Methods of Teaching Farm Mechanics—3 cr. (2 and 3)
Ag Ed 520—Teaching Young Farmers—3 cr. (3 and 0)
Ag Ed 525—Supervision of Student Teaching—3 cr. (3 and 0)
Ag Ed 591—Research—3 cr.
Ag Ed 592—Research—3 cr.

AGRICULTURAL ENGINEERING*

Mr. Snell
Mr. Wilson, Mr. Rogers, Mr. Craig, Mr. Garner

AgE 203—Agricultural Engineering Problems—1 cr. (0 and 3)
A general coverage in the logical approach to the solution of problems with the aid of the slide rule. The development of confidence in the slide rule, neatness, and accuracy are stressed. The course includes a review of the applications of trigonometric functions, logarithms, and a study of graphs and curve fitting. Prerequisite: Math 106.

AgE 205—Farm Shop—3 cr. (2 and 3)
Correct methods and underlying reasons in proper use and maintenance of hand and power tools are emphasized. Principal topics include: carpentry, painting and finishing, soldering, and sheet metal work, farm concrete, pipe fitting and plumbing, and farm and home water supply systems. A course for agricultural students.

AgE 206—Agricultural Mechanization—3 cr. (2 and 3)
The agricultural student is taught to apply physical principles and sound reasoning to the mechanization of modern agricultural production and processing enterprises. Planning efficient operational systems and wise selection of equipment, based on function and economic suitability, are stressed. Prerequisite: Math 105, Phys 201 and 203.

AgE 207—Farm Mechanics—2 cr. (1 and 3)
Methods, techniques and elementary sciences applied to the use of tools and equipment pertinent to farm electrification, structures and machines. Designed

* Jointly administered by the School of Agriculture and the School of Engineering.
for agricultural engineering majors. **Prerequisite:** Math 105, IE 101, and EG 108.

AgE 301—Soil Conservation—3 cr. (2 and 3)
Engineering and agronomic principles are applied to water management in agriculture. Elementary surveying, mathematics, crops and soil fundamentals are embodied into principles and practices of erosion control, drainage, water conservation and irrigation. A course for agricultural students. **Prerequisite:** Math 105.

AgE 304—Farm Electrical Design—3 cr. (2 and 3)
Utilization of basic electrical engineering in study of certain machines and systems. Special attention is given to design of wiring and control systems commonly found in processing installations. **Prerequisite:** EE 307 and 309 and junior standing.

AgE 311—Agricultural Machinery—3 cr. (2 and 3)
Engineering analysis of machines and of basic agricultural operations and systems requiring machine functions. Static force system analysis, energy transfer, functional analysis, machine and system efficiency, and economic considerations are emphasized. **Prerequisite:** Enrollment in EM 302 and junior standing.

AgE 312—Agricultural Tractor Power—3 cr. (2 and 3)
The application of engineering fundamentals to the farm tractor with emphasis upon power development, power transmission, and accessories. Topics include thermodynamic principles; power, its transmission and measurement; traction; hitches, stability and other factors which make the tractor a functionally sound agricultural machine. **Prerequisite:** AgE 311 and ME 302.

AgE 352—Farm Power—3 cr. (2 and 3)
A detailed study of farm tractors and stationary power units. Principles of operation, preventive maintenance, adjustment and general repair are emphasized. A course designed for agricultural majors. **Prerequisite:** AgE 206.

AgE 360—Farm and Home Utilities—3 cr. (2 and 3)
A course for seniors and graduate students in agriculture curriculums, involving a study of electric and other utilities on the farm and in the home. Selection, installation and maintenance of wiring systems, motors and controls, home water systems and sewage disposal systems are emphasized. **Prerequisite:** Junior standing.

AgE 401—Soil and Water Conservation Engineering—3 cr. (2 and 3)
Elementary meteorology, hydrology, soil physics, and principles of fluid mechanics are used to form the basis of analysis and design of water-control structures, such as terraces, outlet channels, diversions, dams, spillways, flumes and drop inlets. **Prerequisite:** CE 200, Agron 202, and enrollment in EM 401.

AgE 402—Drainage and Irrigation—3 cr. (2 and 3)
Surface and sub-surface drainage principles, including flow of water through soils, channel flow and drainage requirements are used in the design of open ditch and tile drainage systems. Irrigation topics include irrigation methods, sources of water for irrigation, the hydraulics of sprinkler irrigation equipment, pumps and power units, water requirements of crops and the design of sprinkler irrigation systems. **Prerequisite:** AgE 401 and EM 401.
AGE 406—ADVANCED AGRICULTURAL MACHINERY—3 cr. (2 and 3)

An analysis and design course to provide training for creative engineering in the field of agricultural power and machinery. Fundamentals of machine design are studied and applied to the design of agricultural machines. Experience is gained with some advanced analytical and experimental techniques. Prerequisite: AgE 311, EM 303 and 304.

AGE 409—SEMINAR—1 cr. (1 and 0)

A course to acquaint senior students in Agricultural Engineering with current status of the profession, utilization of scientific information available in library, and to report findings on a technical subject in a written and oral presentation. Prerequisite: Senior standing in Agricultural Engineering.

AGE 410—AGRICULTURAL ENGINEERING SEMINAR—1 cr. (1 and 0)

A continuation of AgE 409.

AGE 433—AGRICULTURAL PROCESS ENGINEERING—3 cr. (2 and 3)

A course dealing with the unit operations involved in the processing of agricultural products. The application of engineering principles and instrumentation to size reduction, cleaning and grading, mixing, materials handling, work simplification, dehydrating, drying, refrigeration, storage, and related subjects. Prerequisite: EM 401.

AGE 452—FARM STRUCTURE DESIGN—3 cr. (2 and 3)

A study of the relationships of farm service buildings to agriculture as a business enterprise. Consideration is given to over-all planning and design of buildings as well as design of basic building components. Functional considerations and environmental control, with particular emphasis on basic problems in heat transfer and psychometric relationships, are also covered in the course. Prerequisite: EM 304 and ME 302.

AGE 481—FUNDAMENTALS OF GINNING ENGINEERING—3 cr. (2 and 3)

An analysis of the engineering requirements and associated problems in all phases of ginning, such as handling, storage, drying, separating lint, cleaning, pressing, disposing of foreign matter, quarantine treatment, power requirements and safety precautions. Prerequisite: EM 304 or equivalent.

AGE 501—SPECIAL PROBLEMS IN AGRICULTURAL ENGINEERING—3 cr. (3 and 0)

AGE 504—ENGINEERING APPLICATION TO AGRICULTURAL PROCESSING—3 cr. (2 and 3)

AGE 511—AGRICULTURAL POWER AND MACHINERY—3 cr. (3 and 0)

AGE 522—DRAINAGE AND IRRIGATION ENGINEERING—3 cr. (3 and 0)

AG 582—GINNING ENGINEERING—3 cr. (2 and 3)

AGE 591—RESEARCH—3 cr.

AGE 592—RESEARCH—3 cr.
AGRICULTURE

Mr. J. W. Jones, Mr. M. H. Sutherland

AGR 101—Introduction to Agriculture—1 cr. (1 and 0)
Guides to effective study; use of the library; scope of the agricultural industry; agriculture of South Carolina and the United States; organizations and functions of the land-grant institution and other agencies serving agriculture; career opportunities.

AGR 302—Agricultural Extension—2 cr. (2 and 0)
An introductory course designed to acquaint students with the Cooperative Extension Service; its place among other educational agencies; its purpose, philosophy and objectives; how it operates and the results obtained; its social and economic significance; and the use of research data in the development and conduct of the Extension Program.

AGRONOMY

Mr. U. S. Jones

Mr. C. M. Jones, Mr. Peele, Mr. Bardsley, Mr. Byrd, Mr. Craddock,
Mr. Eskew, Mr. Page, Mr. Gossett, Mr. Watkins

AGRON 102—Crop Science—3 cr. (2 and 3)
A fundamental course in crop science, including crops of the major agricultural areas of the United States and emphasizing the crops of South Carolina. Included in the laboratory work is the study of the vegetative and seed characteristics of grasses, legumes, vegetables and weeds of particular importance in South Carolina. Prerequisite: Bot 101.

AGRON 202—Soils—3 cr. (2 and 3)
A basic foundation in soil science is presented with emphasis on the chemical and physical properties of soil, the activities of the living soil organisms, and the origin and classification of soils. This basic information is related to correct soil use and management. Prerequisite: Chem 101 and 102.

AGRON 301—Fertilizers and Manures—3 cr. (3 and 0)
Sources, mining and manufacture, composition, physical characteristics, and use of fertilizers and manures. A detailed study is made of crop responses to fertilizer use. Prerequisite: Agron 202.

AGRON 302—Genetics—3 cr. (2 and 3)
A general coverage of the basic principles of genetics. Examples illustrating the fundamentals of heredity and variation are given for plants and animals, including man. Prerequisite: Bot 101 and Zool 101, 103 or consent of instructor.

AGRON 306—Forage and Pasture Crops—3 cr. (3 and 0)
The characteristics, establishment, utilization and maintenance of crops for hay, silage, and pasture. Crops valuable in South Carolina are emphasized. Prerequisite: Agron 102.

AGRON 308—Physical and Chemical Edaphology—3 cr. (1 and 6)
A study of the physical and chemical properties of soils and their determination in the laboratory. Special emphasis is placed on the relation of these properties to the potential fertility, management practices, and water holding capacity of soils. Prerequisite: Agron 202.
Agron 401—Advanced Crop and Seed Laboratory—1 cr. (0 and 3)
The identification of common field crop varieties, grasses, legumes, and weeds by vegetative and seed characteristics. Experience is gained in the rating of field crop varieties for important agronomic characteristics. Prerequisite: Agron 102 and 306 or consent of instructor.

Agron 403—Soil Classification—2 cr. (1 and 3)
Theoretical and practical phases of soil survey, formation and classification in relation to land usage and plant adaptability. Prerequisite: Agron 202 or consent of instructor.

Agron 405—Plant Breeding—3 cr. (2 and 3)
The application of genetic principles to the development of improved crops. Principal topics include the genetic and cytogenetic basis of plant breeding, mode of reproduction, techniques in selfing and crossing, methods of breeding, inheritance in the major crops, and biometrical methods. Prerequisite: Agron 302.

Agron 407—Principles of Weed Control—3 cr. (2 and 3).
Weeds, their introduction, ecology, methods of reproduction, dissemination, and control; chemistry and mode of action of herbicides, equipment and techniques of application; a characterization of the common weeds of the Southeast. Prerequisite: Agron 102, Ch 220 or equivalent.

Agron 409—Cotton and Tobacco—3 cr. (3 and 0)
History, morphology, physiology, fertilization, cultivation, insect and disease control, varieties, breeding, harvesting, grading and marketing of American Upland cotton and flue cured tobacco. The two crops are studied separately, about half a semester being devoted to each. Prerequisite: Agron 102.

Agron 452—Soil Fertility and Management—2 cr. (2 and 0)
Principles of crop rotations, soil fertility, soil management, and other factors necessary for the practical utilization of soils. Prerequisite: Agron 202 or consent of instructor.

Agron 455—Seminar—1 cr. (1 and 0)
Student presentation of current agronomic topics of special interest in crop production appearing in recent scientific journals and other publications.

Agron 456—Seminar—1 cr. (1 and 0)
Student presentation of current topics of special interest in the field of soil science appearing in recent scientific journals and other publications.

Agron 501—Nutrition of Crops—3 cr. (3 and 0)
Agron 502—Pedology and Soil Classification—3 cr. (3 and 0)
Agron 503—Crop Production—3 cr. (3 and 0)
Agron 504—Plant Breeding and Genetics—3 cr. (3 and 0)
Agron 505—Soil Fertility—3 cr. (3 and 0)
Agron 506—Special Problems—2 cr. (2 and 0)
Agron 507—Soil Physics—3 cr. (2 and 3)
Agron 508—Soil Chemistry—3 cr. (2 and 3)
Agron 591—Research—3 cr.
Agron 592—Research—3 cr.
Agron 691—Doctoral Research and Thesis—Credit to be arranged.

Air Science

Lieutenant Colonel Cotter
Lt. Col. Fiebig, Lt. Col. Franklin, Maj. Reed, Capt. Hill,
Capt. Howard, Capt. Johnson

AS 109—Foundations of Aerospace Power—1 cr. (2 and 1)
A general survey of aerospace power designed to provide the student with
an understanding of the elements of aerospace power; and an introduction to
the mechanics of aerospace vehicles, and to the composition of and necessity
for national security forces. Laboratory periods provide training in drill
fundamentals and leadership.

AS 110—Foundations of Aerospace Power—1 cr. (2 and 1)
A continuation of AS 109 and laboratory phase of basic military training.

AS 209—Fundamentals of Aerospace Weapon Systems—1 cr. (2 and 1)
Introduction to aircraft and missiles and their propulsion systems. Also
introduction to target intelligence, electronic warfare, and mechanics and implica-
tions of the most modern weaponry—nuclear, chemical, and biological.
Leadership Laboratory.

AS 210—Fundamentals of Aerospace Weapon Systems—1 cr. (2 and 1)
Continuation of weapon technology. Introduction to strategic tactical and air
defense concepts. Problems and possibilities in future military space operations.
Contemporary military thought concerning strategy in the nuclear and space
age. Leadership Laboratory.

AS 309—Air Force Officer Development—3 cr. (4 and 1)
Staff organization and functions, and the skills required for effective staff
work, including oral and written communication, observing, and individual and
group problem solving. This course provides both principles and practice
through a Leadership Laboratory.

AS 310—Air Force Officer Development—3 cr. (4 and 1)
Principles and practices of leadership. This includes basic psychology of
leadership, the military justice system, and application of problem techniques
and leadership theory to simulated and real Air Force problems.

AS 409—Global Relations—3 cr. (4 and 1)
An intensive study of global relations of special concern to the Air Force
officer with emphasis on international relations and geography. Includes
weather and navigation.

AS 410—Global Relations—3 cr. (4 and 1)
Forty-five hours are devoted to a study of the concepts of the military
aspects of political geography; maps and charts; factors of power; and the
geographic influences upon political problems with a geopolitical analysis of
the strategic areas. Fifteen hours are devoted to a study of materials to help
the cadet make a rapid, effective adjustment to active duty as an officer of the
United States Air Force.
ANIMAL HUSBANDRY

Mr. Wheeler

Mr. Godley, Mr. Ritchie, Mr. Edwards, Mr. Handlin, Mr. Skelley

AH 102—Animal Science—2 cr. (2 and 0)
An introductory course in Animal Science to include beef cattle, swine, poultry, dairying, horses and sheep.

AH 104—Animal Science Laboratory—1 cr. (0 and 3)
The judging, grading, selection and management of farm animals is given considerable emphasis. Two laboratory periods are devoted to dairy production and manufacturing and also two periods to poultry.

AH 301—Feeds and Feeding—3 cr. (3 and 0)
Feed nutrients, digestion, metabolism of feed stuffs, nutritive ratios, feeding standards, and the balancing of rations. Prerequisite: AH 102, 104 and Ch 220.

AH 303—Feeds and Feeding Laboratory—1 cr. (0 and 3)
Practical work in mixing and balancing rations and identifying feed stuffs. Prerequisite: AH 102, 104 and Ch 220 or consent of instructor.

AH 305—Meat Grading and Selection—2 cr. (1 and 3)
Classification, grading and selection of beef, lamb and pork carcasses and wholesale cuts. Factors influencing quality and value. Students enrolled in this course are eligible to compete in Intercollegiate Meat Judging Contests. Prerequisite: AH 102, 104.

AH 306—Judging—2 cr. (1 and 3)
Selection, breed characteristics and grading of beef cattle, sheep and swine. Students enrolled in this course are eligible to compete in the Southeastern Intercollegiate Livestock Judging Contest. Prerequisite: AH 102, 104.

AH 353—Meats—1 cr. (1 and 0)
The chemical and physical composition of meat, meat hygiene; nutritive value; curing; freezing; and meat by-products. Prerequisite: AH 102, 104.

AH 355—Meats Laboratory—2 cr. (0 and 6)
The selection and grading of meat animals and carcasses. Practical work in slaughtering of animals and in the cutting, curing and freezing of meats. Emphasis is placed on the identification of wholesale and retail cuts. Prerequisite: AH 102, 104.

AH 401—Beef Production—3 cr. (3 and 0)
Breeding, feeding, management and grading of beef cattle. Emphasis is placed on year-round grazing. Prerequisite: AH 301.

AH 403—Beef Production Laboratory—1 cr. (0 and 3)
Practical application of beef production practices. Prerequisite: AH 301.

AH 405—Advanced Judging—1 cr. (0 and 3)
A continuation of AH 306 for students who are interested in participating in judging contests or in receiving special training in the selection of breeding cattle, sheep and swine. Also judging and grading of market classes are considered. Prerequisite: AH 306.
AH 406—Seminar—2 cr. (2 and 0)
Special problems in animal production. Each student is given a subject on which he makes weekly reports of progress before seminar group. Prerequisite: AH 301.

AH 407—Horse and Sheep Production—2 cr. (2 and 0)
The breeding, feeding and care of horses and sheep; the shearing and marketing of sheep and wool; the adaptability of breeds; and parasite and disease control. Prerequisite: AH 301.

AH 408—Pork Production—3 cr. (3 and 0)
Feeding, breeding, management, and marketing of hogs. Emphasis is placed on winter and summer forages, protein supplements, mineral mixtures, and sanitation practices. In laboratory grading, selection, feeding, management and care of swine is given considerable attention. Prerequisite: AH 301.

AH 409—Horse and Sheep Production Laboratory—1 cr. (0 and 3)
Horse and sheep production practices. Prerequisite: AH 301.

AH 410—Pork Production Laboratory—1 cr. (0 and 3)
Practical application of swine production practices. Prerequisite: AH 301.

AH 452—Animal Breeding—3 cr. (3 and 0)
The fundamental principles relating to the breeding and improvement of livestock including variation, heredity, selection, linebreeding, inbreeding, crossbreeding and other related subjects. Prerequisite: Agron 302.

AH 502—Topical Problems—1-3 cr. (1-3 and 0)
AH 503—Meat Technology—3 cr. (3 and 0)
AH 504—Methods in Animal Breeding—3 cr. (3 and 0)
AH 505—Nutrition of Meat Animals—3 cr. (3 and 0)
AH 591—Research—3 cr.
AH 592—Research—3 cr.

ARCHITECTURE
Mr. McClure
Mr. Gunnin, Mr. Means, Mr. Cooleidge, Mr. Garvin, Mr. Hodges,
Mr. Hunter, Mr. Young, Mr. Acorn, Mr. McMinn,
Mr. Pinckney, Mr. Regnier, Mr. Rogers,
Mr. Streatfield, Mr. Williamson,
Mr. Craig

Arch 103—Environmental Technology I—2 cr. (1 and 3)
A study of the principles of graphic representation, mathematical procedures related to architecture, and the use of the slide rule.

Arch 104—Environmental Technology II—2 cr. (1 and 3)
The solution of site planning and topographical problems. Prerequisite: Arch 103.

Arch 105—Visual Arts—2 cr. (0 and 6)
Elementary studio work in drawing, painting and related media.
Arch 106—Visual Arts—2 cr. (0 and 6)  
Continuation of Arch 105.

Arch Const 141—Elements of Building I—5 cr. (2 and 9)  
An introduction to the principles of building construction. Emphasis is placed on fundamental types, materials, and methods of building construction.

Arch Const 142—Elements of Building II—5 cr. (2 and 9)  
A continuation of Arch Const 141. Prerequisite: Arch Const 141.

Arch 151—Basic Design Course Group—5 cr. (1 and 12)  
Studio problems in visual fundamentals, including principles of graphic and three dimensional representation. Adjunct lectures and exercises in architectural theory and basic construction are included in the content of the course group.

Arch 152—Beginning Architectural Design Course Group—5 cr. (1 and 12)  
Studio problems in elements of architecture, including principles of graphic and three dimensional representation. Lectures and exercises in architectural theory and basic construction are continued. Prerequisite: Arch 151 with C standing.

Arch 205—Visual Arts—2 cr. (0 and 6)  
Studio working in drawing and painting.

Arch 206—Visual Arts—2 cr. (0 and 6)  
Continuation of Arch 205.

Arch Const 241—Elements of Building III—6 cr. (3 and 9)  
The development of building construction projects with emphasis on the organizational requirements necessary for execution. Prerequisite: Arch Const 142.

Arch Const 242—Elements of Building IV—6 cr. (3 and 9)  
A continuation of Arch Const 241. Prerequisite: Arch Const 241.

Arch 251—Architectural Design Course Group—6 cr. (1 and 15)  
The design of small buildings with attention to man’s functional needs, aesthetics and simple structural analysis. Studio problems and related lectures. Prerequisite: Arch 152 with C standing.

Arch 252—Architectural Design Course Group—6 cr. (1 and 15)  
Continuation of Arch 251. Prerequisite: Arch 251 with C standing.

Arch 305—Visual Arts—2 cr. (0 and 6)  
Principles of Printmaking and solution of studio problems in the graphic arts.

Arch 306—Visual Arts—2 cr. (0 and 6)  
Continuation of Arch 305.

Arch 307—Visual Arts—2 cr. (2 and 6)  
Studio work in sculpture and related media.

Arch 308—Visual Arts—2 cr. (0 and 6)  
Continuation of Arch 307.

Arch 309—Architectural History I—2 cr. (2 and 0)  
The architectural history of Western man from 15000 B.C. to A.D. 323, with particular attention to Mesopotamia, Egypt, Greece, and the Roman Empire.
Arch 310—Architectural History II—2 cr. (2 and 0)
The architectural history of Europe and the Near East from A.D. 323 to 1453, with particular attention to the Byzantine, pre-Romanesque, Romanesque, and Gothic schools of Western Europe.

Arch 351—Architectural Design Course Group—7 cr. (1 and 18)
The design of buildings of intermediate complexity with special attention to detail and development. Studio problems and related lectures. Prerequisite: Arch 252 with C standing.

Arch 352—Architectural Design Course Group—7 cr. (1 and 18)
Continuation of Arch 351. Prerequisite: Arch 351 with C standing.

Arch 403—Introduction to the Visual Arts—3 cr. (3 and 0)
A survey of man’s production in the Visual Arts with particular attention to the environmental factors in society which demand art and a study of techniques used by the artist. Illustrated lectures and collateral reading.

Arch 405—Visual Arts—2 cr. (0 and 6)
Advanced studio work in painting. Prerequisite: Fourth-year standing.

Arch 406—Visual Arts—2 cr. (0 and 6)
Continuation of Arch 405.

Arch 407—Industrial Design—2 cr. (1 and 3)
The design of objects for everyday living, including presentation by drawing and model. Prerequisite: Third-year standing in Architecture or special permission.

Arch 408—Industrial Design—2 cr. (1 and 3)
Continuation of Arch 407. Prerequisite: Arch 407.

Arch 411—History of Arts—3 cr. (3 and 0)
Seminar in the Arts covering detailed study of some particular aspect or period. Limited to students with third-year standing and above.

Arch 412—History of Arts—3 cr. (3 and 0)
Continuation of Arch 411. Prerequisite: Arch 411.

Arch 413—Architectural History III—2 cr. (2 and 0)
The architectural history of Western Europe and the Americas from 1453 to 1775, with particular attention to the Renaissance, Baroque, and Revivalist schools.

Arch 414—Architectural History IV—2 cr. (2 and 0)
The architectural history of Western Europe and the Americas from 1775 to 1915 with particular attention to the architecture of the Industrial Revolution and the development of the academies.

Arch 415—Structural Methods—2 cr. (2 and 0)
A lecture course relating concrete and steel structural systems to contemporary considerations of function, aesthetics and economics. A special study is made of building codes and other regulations. Prerequisite: Fourth-year standing.

Arch Const 441—Building Construction—8 cr. (2 and 18)
A detailed study of the total building construction project. Estimates, plant layout, organization, trade coordination and work schedules emphasized. Prerequisite: Arch Const 242.
ARCH CONST 442—Building Construction Thesis—8 cr. (2 and 18)
The selection and development of a thesis of appropriate scope, conducting
necessary research, programming and presentation. Prerequisite: Arch Const
441.

ARCH 451—Architectural Design Course Group—8 cr. (2 and 18)
The programming and solution of complex building design problems, includ-
ing interior and site development and Contract Documents. Prerequisite: Arch
352 with C standing.

ARCH 452—Architectural Design Course Group—8 cr. (2 and 18)
Continuation of Arch 451. Prerequisite: Arch 451 with C standing.

ARCH 453—Advanced Architectural Construction—4 cr. (1 and 9)
A study of the methods, materials, and details involved in the construction
of a complex multi-storied building. Prerequisite: Fourth-year standing.

ARCH 475—Mechanical Plant—2 cr. (2 and 0)
A study of the water supply, plumbing, heating and ventilating systems of
present-day buildings.

ARCH 476—Mechanical Plant—2 cr. (2 and 0)
A study of air-conditioning, electrical systems, lighting, mechanical trans-
portation and acoustics as applied to contemporary buildings. Prerequisite:
Arch 475.

ARCH 480—Architectural Office Practice—2 cr. (2 and 0)
General consideration of architectural office procedure. Study of the pro-
fessional relationship of the architect to client and contractor, including
problems of ethics, law, and business.

ARCH 481—Architectural Office Practice—2 cr. (2 and 0)
A continuation of Arch 480. Prerequisite: Arch 480.

ARCH 491—Architectural and Town Planning Design—11 cr. (5 and 18)
Lectures and studio problems in advanced architectural design and Town
Planning. Course content will include pre-Thesis studies. Prerequisite: Arch
452 with C standing.

ARCH 492—Architectural Thesis—11 cr. (5 and 18)
The student working individually will carefully program an environmental
problem of appropriate scope, and conduct his own comprehensive research.
He will make a complete oral, written and visual presentation of his solution.
Prerequisite: Arch 491.

ARCH 493—Structural Thesis Research—5 cr. (0 and 15)
Studio and laboratory research studies preliminary to undertaking a Thesis
in Architectural Structures. Prerequisite: Arch 493.

ARCH 494—Thesis in Architectural Structures—11 cr. (5 and 18)
The student working individually with laboratory and lecture support will
prepare and present a Structural Thesis of appropriate scope and complexity.
Prerequisite: Arch 493.

ARCH 511—History Seminar I—3 cr. (3 and 0)
ARCH 512—History Seminar II—3 cr. (3 and 0)
ARCH 515—Structural Seminar I—3 cr. (2 and 3)
Bacteriology

Mr. Epps

Mr. Rush Mr. Bond

BACT 301—GENERAL BACTERIOLOGY—4 cr. (3 and 3)
Morphology, physiology, classification, distribution, and cultivation of microorganisms; effects of organisms on their environment; microorganisms and health. Prerequisite: Bot 101 or Zool 101 and 103; Ch 101; Ch 102.

BACT 312—FOOD MICROBIOLOGY—3 cr. (2 and 3)
The microbiology of natural and processed foods. The nature of microorganisms involved in food processing, food spoilage, and food poisoning. Methods of isolating, enumerating and identifying these organisms are conducted in the laboratory. Prerequisite: Bact 301.

BACT 401—ADVANCED BACTERIOLOGY—4 cr. (2 and 6)
Metabolism, nutrition, growth, and death of bacteria; microbiological assays, and industrial fermentation; emphasis on laboratory procedures for the identification of the more common taxonomic groups. Prerequisite: Bact 301; Ch 220 or 323 and 327.

BACT 402—DAIRY BACTERIOLOGY—3 cr. (2 and 3)
Morphology, physiology and culturing of microorganisms of importance in dairy products; standard methods for the determination of numbers of bacteria, yeasts, and molds in various dairy products. Prerequisite: Bact 301.

BACT 406—SANITARY BACTERIOLOGY—3 cr. (2 and 3)
The relation of bacteria to water purification and sewage disposal. Methods of water analysis, water purification, and sewage disposal are investigated in the laboratory. Public health aspects are stressed. Prerequisite: Bact 301.

BACT 410—SOIL MICROBIOLOGY—3 cr. (2 and 3)
The role of microorganisms in the decomposition of organic substances; transformation of nitrogen and mineral substances in the soil; interrelationships between higher plants and soil microorganisms; importance of microorganisms in soil fertility. Prerequisite: Bact 301.

BACT 501—BACTERIAL TAXONOMY—3 cr. (2 and 3)
BACT 502—BACTERIOLOGY TECHNIC—4 cr. (2 and 6)
BACT 503—SPECIAL PROBLEMS IN BACTERIOLOGY—2 cr.
BACT 505—PHYSIOLOGY OF BACTERIA—3 cr. (2 and 3)
BACT 510—SOIL MICROBIOLOGY—3 cr. (2 and 3)
BACT 591—RESEARCH—3 cr.
BACT 592—RESEARCH—3 cr.
BIOLOGY

(See Biology Curriculum, page 126)

Biol 450—Biology for High School Teachers—3 cr. (3 and 0)

The fundamental principles of biological processes are reviewed and expanded. Demonstrations, preparations, illustrations, and experiments suitable for use in high school teaching are emphasized. Expressly designed for biology teachers in the secondary schools.

Biol 500—Principles of Biology—3 cr. (2 and 3)

Biol 501—The New Biology—3 cr. (3½ and 0)

Biol 502—The New Biology—3 cr. (3½ and 0)

BOTANY

Mr. Epps

Mr. Matthews, Mr. Rutledge, Mr. Whitney, Mr. Ashworth, Mr. Foster, Mr. Halpin, Mr. Witcher, Mr. Kingsland

Bot 101—General Botany—4 cr. (3 and 3)

The form, structure and physiology of the higher plants, followed by the algae, bacteria, fungi, liverworts, mosses and ferns, with the application of the biological laws. Descriptions, life histories and adaptation of representative organisms.

Bot 352—Plant Physiology—4 cr. (3 and 3)

The relations and processes which have to do with the maintenance, growth and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products and liberation of energy. Prerequisite: Bot 101; Ch 101 and 102; Phys 201 and 203 or Phys 211 and 213.

Bot 355—Histology—2 cr. (0 and 6)

The principles of fixing, cutting and staining plant tissues and the various other processes of micro-technique and their application to specific forms of plants. Prerequisite: Bot 101; Ch 101 and 102.

Bot 356—Taxonomy—3 cr. (1 and 6)

The identification, classification, distribution and interrelationship of flowering plants with emphasis on the flora of South Carolina. Prerequisite: Bot 101.

Bot 401—Plant Pathology—3 cr. (2 and 3)

The major plant diseases of the South, their symptoms and control and the nature of the causal agents or factors. Prerequisite: Bot 101.

Bot 402—Economic Botany—3 cr. (2 and 3)

Plants and plant products and their relationship to human history and contemporary life. Sources of plant products, especially those outside the scope of courses in Agronomy and Horticulture. Prerequisite: Bot 101. Other students who present evidence of good scholarship may elect.

Bot 404—Cytology—4 cr. (3 and 3)

The morphological and chemical consideration of the cell, including the basic micro-techniques involved in preparing materials for microscopic study and a survey of animal and plant cell types. Cell division and meiosis and
the relation of these to development, reproduction, and heredity. **Prerequisite:**
Zool 101, 103, Bot 101, Ch 101 and Ch 102.

**Bot 405—Forest Pathology—**3 cr. (2 and 3)
Symptoms and causative agents of forest tree diseases; their prevention and control; their relation to silviculture, management, and utilization of forests. **Prerequisite:** Bot 101.

**Bot 451—Morphology of the Fungi—**3 cr. (2 and 3)
The morphology and taxonomy of the fungi, with special emphasis on methods of pure culture as they apply to parasitic and saprophytic forms. **Prerequisite:** Bot 101.

**Bot 452—Ecology—**4 cr. (2 and 6)
The fundamental principles of the relations between plants and environmental conditions with special attention to local ecological relationships and problems. **Prerequisite:** Bot 101.

**Bot 455—Plant Morphology—**4 cr. (2 and 6)
The structure of vegetative and reproductive parts of plants representing the major plant groups except bacteria and fungi. **Prerequisite:** Bot 101.

**Bot 501—Physiology—**4 cr. (2 and 6)
**Bot 502—Mycology—**3 cr. (2 and 3)
**Bot 503—Plant Pathology—**4 cr. (3 and 3)
**Bot 504—Physiology of Parasitism in Plants—**3 cr. (3 and 0)
**Bot 505—Special Problems in Plant Pathology—**Credit to be arranged
**Bot 506—Control of Plant Diseases—**3 cr. (3 and 0)

**Bot 591—Research—**3 cr.
**Bot 592—Research—**3 cr.

**CERAMIC ARTS**

**Mr. Robinson, Mr. Fain**

**Cr Ar 101—Pottery Materials—**3 cr. (2 and 3)
The occurrence and properties of pottery raw materials. Special attention is devoted to the occurrence of natural pottery materials in South Carolina, and the methods and equipment used in preparing these materials. A discussion is included on materials available from commercial supply houses.

**Cr Ar 102—Pottery Drying and Firing—**3 cr. (3 and 0)
The drying and firing processes used in pottery making. A discussion is included on the design and construction of simple pottery kilns and the student is required to build and operate a small outdoor kiln. The laboratory work demonstrates the drying and firing behavior of pottery.

**Cr Ar 301—Pottery Glazes—**3 cr. (3 and 0)
The materials and methods used in preparing glazes and a study of the methods used in decorating pottery products. **Prerequisite:** Cr Ar 101 and 102.

**Cr Ar 401—Advanced Pottery—**3 cr. (2 and 3)
The student is given advanced training in pottery techniques and pottery equipment. **Prerequisite:** Cr Ar 101 and 102.
CERAMIC ENGINEERING

Mr. Robinson
Mr. Wilson, Mr. Fain, Mr. Lefort

CrE 201—Introduction to Ceramic Engineering—2 cr. (2 and 0)
The unit operations of ceramic manufacture and the fundamentals that form
the basis of these operations. In addition, a study is made of the properties of
ceramic product, relating composition and particle or aggregate structure to
these properties. Laboratory techniques for determining these properties are
included in this course.

CrE 202—Ceramic Materials—3 cr. (3 and 0)
A study of the properties and uses of commonly used ceramic materials.
Equilibrium diagrams are used to gain an understanding of the effect of heat
on the materials.

CrE 204—Laboratory Procedures—1 cr. (0 and 3)
An introduction to ceramic laboratory procedures. Primary consideration will
be given to the evaluation of sources of error and significance of measurement
in the major ceramic test procedures.

CrE 302—Thermo-Chemical Ceramics—3 cr. (3 and 0)
High-temperature equilibrium using the laws of physical chemistry as applied
to ceramic systems in both solid and liquid states. An introduction to the
crystal chemistry of ceramic raw materials, and the effect of crystalline form
on their high-temperature behavior.

CrE 303—Introduction to Material Science—2 cr. (2 and 0)
A beginning course in material science designed primarily for engineering
students. The electrical, mechanical and thermal properties of materials are
studied on the basis of their atomic arrangement, their macrostructure and their
manufacturing history.

CrE 304—Experiment Design—1 cr. (0 and 3)
An exercise in the planning and organization of experiments in the ceramic
field.

CrE 306—Fuels Combustion and Heat Transfer—1 cr. (0 and 3)
A study of combustion devices, the calculation of combustion problems and
heat transfer.

CrE 307—The Drying and Firing of Ceramic Products—3 cr. (3 and 0)
The fundamentals, operation, design and control of the drying and firing
operations. The study of heat transfer, fuels and combustion, movement of
gases, evaporation and high temperature reactions is included in the course.
Time is devoted to the methods of calculation of heat and air requirements
and the determination of heat balances for dryers and kilns. The influence of
particle and aggregate structure on speed and extent of reaction is part of this
course. Prerequisite: CrE 202, Phys 212 and 214.

CrE 309—Research Methods—2 cr. (0 and 6)
An exercise in the planning and solution of selected research problems.

CrE 402—Solid State Ceramics—3 cr. (3 and 0)
The effects of the composition, form, and shape of ceramic raw materials on
the manufacturing processes and final properties of ceramic products. Included
are fundamental studies of such phenomena as deflocculation, plasticity, sintering and the behavior of ceramic products in electrical circuits. **Prerequisite:** Junior standing.

**CrE 403—Glasses**—3 cr. (3 and 0)

The glassy state of matter and the fundamental properties of glasses. A part of the course time is devoted to glass raw materials and manufacturing methods, together with a consideration of the use of glass for glass products, enamels, glazes and vitreous bonds. **Prerequisite:** CrE 302.

**CrE 404—Enamels**—3 cr. (3 and 0)

The raw materials, methods of manufacture, and properties of porcelain enamel coatings for metals. **Prerequisite:** CrE 302.

**CrE 406—Ceramic Project**—2 cr. (0 and 6)

The completion of an original research into a ceramic problem. **Prerequisite:** CrE 302.

**CrE 407—Plant Design**—3 cr. (1 and 6)

The application of the fundamentals of ceramic engineering to problems in plant design. **Prerequisite:** Senior standing in Ceramic Engineering.

**CrE 410—Analytical Processes**—3 cr. (3 and 0)

An introductory course on the theory and use of X-ray diffraction and spectroscopic methods. **Prerequisite:** Junior standing.

**CrE 412—Raw Material Preparation**—3 cr. (3 and 0)

The equipment and processes used in the crushing and grinding of raw materials, the separation and classification of particle sizes, and the separation and purification of minerals by mineral dressing methods.

**CrE 416—Electronic Ceramics**—3 cr. (3 and 0)

A study of the theory and measurement of the electronic properties of ceramic products.

**CrE 418—Process Control**—3 cr. (3 and 0)

Process control techniques and apparatus with particular emphasis on temperature measurement and control systems. The application of laboratory techniques to the control of product quality and process efficiency is included. **Prerequisite:** Junior standing.

**CrE 419—Science of Engineering Materials**—3 cr. (3 and 0)

This course is planned to acquaint the chemical, electrical, and mechanical engineers and the metallurgist with the refractory, electrical, corrosive, and abrasive characteristics of ceramic products. It emphasizes fundamental consideration of the structure of matter in the solid and glassy states, solid state reactions, and the influence of particle and aggregate structure to speed of reaction and product properties. The reasons for the properties of materials at elevated temperatures and room temperatures are related to these fundamentals. The course is intended to give engineers information that will help them design parts for high temperature applications such as in aircraft and nuclear plants, equipment that must withstand corrosion at elevated temperatures or electronic equipment that must operate at elevated temperatures.
CrE 420—Science of Engineering Materials—3 cr. (3 and 0)
A continuation of CrE 419 with emphasis on applications of fundamentals in nuclear reactors and nuclear power plants. Consideration is given to the development of ceramics for fuel elements, moderator materials, control rods, shielding and in radioactive waste disposal.

CrE 501—Analytical Procedures and Equipment—3 cr. (2 and 3)
CrE 502—Silicate Crystallography—3 cr. (3 and 0)
CrE 503—Ceramic Production Control—3 cr. (3 and 0)
CrE 504—Ceramic Quality Control—3 cr. (3 and 0)
CrE 505—Drying—3 cr. (2 and 3)
CrE 506—Firing—3 cr. (2 and 3)
CrE 507—Specialized Ceramics—3 cr. (3 and 0)
CrE 591—Research—3 cr.
CrE 592—Research—3 cr.

CHEMICAL ENGINEERING
Mr. Littlejohn
Mr. Harshman, Mr. Meenaghan, Mr. Alley, Mr. Barlage, Mr. Bruley

ChE 204—Introduction to Chemical Engineering—2 cr. (1 and 3)
A course designed to acquaint students with the profession of Chemical Engineering and to introduce them to certain basic concepts and methods used by the chemical engineer. Topics include the chemical engineering literature, graphical methods of presenting data, graphical solutions to problems, process variables, stoichiometry, and PVT relations for gases. Prerequisite: Ch 102 and Math 106.

ChE 205—Introduction to Chemical Engineering—3 cr. (2 and 3)
A continuation of ChE 204. Topics include properties of mixtures of gases and vapors, material and energy balances, equilibria in chemical systems, dimensional analysis, economic considerations, and an introduction to stagewise calculations involving solvent extraction. Prerequisite: ChE 204, Math 205, and Phys 211.

ChE 301—Principles of Chemical Engineering—3 cr. (3 and 0)
The general principles of Chemical Engineering and a study of the following unit operations: Fluid Flow, Fluid Transportation, Heat Transmission and Evaporation. Special emphasis is placed on theory and its practical application. This is accomplished through the presentation of comprehensive calculations. Prerequisite: ChE 205, Phys 211 and 212, Math 206 and Junior standing.

ChE 302—Principles of Chemical Engineering—3 cr. (3 and 0)
A study of selected unit operations based on diffusion. Both stagewise and differential contacts are studied for gas absorption, distillation, and gas-liquid contact operations. Prerequisite: ChE 301 and Junior standing.

ChE 304—Elements of Food Process Engineering I—3 cr. (3 and 0)
A brief, theoretical treatment of several of the unit operations of chemical engineering that are encountered in the food industry. Topics will include
Chemical Engineering

material and energy balances, fluid mechanics, heat transfer, and evaporation. Not open to Chemical Engineering majors. Prerequisite: Math 206 and Phys 212.

ChE 305—ELEMENTS OF FOOD PROCESS ENGINEERING II—2 cr. (1 and 3)
A continuation of ChE 304 to include lectures in mass transfer and laboratory exercises, including comprehensive reports, in unit operations pertaining to food engineering. Not open to Chemical Engineering majors. Prerequisite: ChE 304.

ChE 306—UNIT OPERATIONS—1 cr. (0 and 3)
Laboratory work in the unit operations of fluid flow, heat transfer, and evaporation. Stress is laid on the relation between theory and experimental results and on report writing. Prerequisite: ChE 301 and Junior standing.

ChE 307—ANALOG COMPUTATION—1 cr. (0 and 3)
An introduction to the theory and application of electronic analog computers. Prerequisite: Math 306.

ChE 331—CHEMICAL ENGINEERING THERMODYNAMICS—3 cr. (3 and 0)
A first basic course in static equilibria. Topics include the First and Second Law of Thermodynamics, real and ideal gases, thermodynamic properties of fluids, phase changes, and heats of reaction. Prerequisite: Ch 331, Math 306, or enrollment in Math 306, and Junior standing; or permission of the Department Head.

ChE 401—PRINCIPLES OF CHEMICAL ENGINEERING—3 cr. (3 and 0)
A study of heat, mass, and momentum transport with emphasis being laid on how the three processes are related. A firmer theoretical foundation for the previous work in unit operations is laid. Prerequisite: ChE 302 and Senior standing.

ChE 407—UNIT OPERATIONS—2 cr. (0 and 6)
Laboratory work for the diffusional unit operations. Competent technical reports are required. Prerequisite: Enrollment in ChE 401 and Senior standing.

ChE 409—PLANT DESIGN—2 cr. (0 and 6)
A detailed study of the design of a chemical plant involving such factors as process to be employed, equipment selection, specification writing and cost accounting, and plant location. Prerequisite: ChE 401 and 430; Senior standing, or permission of the Department Head.

ChE 411—CHEMICAL ENGINEERING LIBRARY MATERIALS—1 cr. (0 and 3)
The first semester of the senior thesis. Thesis projects are assigned. The student reviews the literature of the chosen field and writes the literature review section of his thesis. The use of the technical literature in the solution of chemical engineering problems is stressed. Prerequisite: Completion of all required 300 courses in chemistry and chemical engineering and Senior standing.

ChE 412—THESIS—2 cr. (0 and 6)
The investigation of a research project in Chemical Engineering. A competent bachelor thesis is required. Prerequisite: ChE 401, 407, 411, 430, and Senior standing or permission of the Department Head.

ChE 415—INTRODUCTION TO NUCLEAR ENGINEERING—3 cr. (3 and 0)
Designed to acquaint the non-nuclear engineer with some of the engineering aspects of nuclear science. Topics include a brief survey of particle physics; nuclear reactions; energy transformations; nuclear reactors, their design, con-
struction and use; radiation damage to materials of construction; and special problems in nuclear engineering peculiar to the basic engineering disciplines. Prerequisite: Junior or Senior standing in Engineering, Chemistry or Physics.

ChE 416—INTRODUCTION TO NUCLEAR ENGINEERING—3 cr. (3 and 0)
A continuation of ChE 415; topics to include reactor principles, plutonium products, reactor types, materials of reactor construction, control instruments, and waste disposal. Prerequisite: ChE 415.

ChE 423—THEORY OF BIO-OXIDATION PROCESSES—2 cr. (2 and 0)
This course is designed to cover the basic biochemical principles underlying bio-oxidation and their applications in activated sludge and trickling filter processes; basic theory of oxygen transfer and its application to the design of aeration equipment; and the design and operation of typical industrial waste treatment processes. Prerequisite: Ch 331 or permission of instructor.

ChE 425—CHEMICAL PROCESS ENGINEERING—3 cr. (3 and 0)
An advanced treatment of chemical engineering unit operations and unit processes. The course is designed to give the undergraduate more depth in these areas. Prerequisite: Permission of the instructor.

ChE 430—CHEMICAL ENGINEERING THERMODYNAMICS—3 cr. (3 and 0)
A continuation of ChE 331. Subjects include heat engines, compressors, refrigeration, phase equilibria and chemical reaction equilibria. Prerequisite: ChE 331 and Senior standing.

ChE 450—CHEMICAL ENGINEERING KINETICS—3 cr. (3 and 0)
An introduction to the kinetics of chemical reactions. Topics include homogeneous and heterogeneous reactions, batch and flow reaction systems, catalysis, and design of industrial reactors. Prerequisite: ChE 430 or permission of the Department Head.

ChE 452—MOLECULAR AND TURBULENT TRANSPORT—3 cr. (3 and 0)
A theoretical treatment of the fundamental mechanisms of molecular and turbulent heat, mass, and momentum transport with the major emphasis given to the interrelation of all three mechanisms. Evaluation and correlation of transport properties and both steady state and unsteady state processes are considered. An elective course for non-chemical engineering students. Prerequisite: Senior standing in Chemistry, Engineering, or Physics, and Math 306.

ChE 453—ANALYSIS OF AUTOMATIC PROCESS CONTROL—3 cr. (3 and 0)
A study of basic process control and the effect of feedback in various systems. The mathematical analysis of the dynamic response of process systems to step and sinusoidal changes. Determination of the optimum settings for various combinations of proportional, reset and derivative control. Prerequisite: Junior or Senior standing in Engineering, Physics, or Chemistry, and Math 306.

ChE 503—HEAT, MASS, AND MOMENTUM TRANSFER—3 cr. (3 and 0)
ChE 504—CHEMICAL ENGINEERING THERMODYNAMICS—3 cr. (3 and 0)
ChE 505—CHEMICAL ENGINEERING KINETICS—3 cr. (3 and 0)
ChE 506—CHEMICAL ENGINEERING CALCULATIONS I—3 cr. (3 and 0)
ChE 507—CHEMICAL ENGINEERING CALCULATIONS II—3 cr. (3 and 0)
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Notes</th>
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<tr>
<td>ChE 508</td>
<td>Chemical Engineering Design and Analysis</td>
<td>3 cr.</td>
<td>(1 and 6)</td>
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<td>ChE 509</td>
<td>Waste Treatment</td>
<td>3 cr.</td>
<td>(3 and 0)</td>
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<td>ChE 510</td>
<td>Biochemical Engineering</td>
<td>3 cr.</td>
<td>(3 and 0)</td>
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<td>ChE 520</td>
<td>Unit Operations</td>
<td>3 cr.</td>
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<td>ChE 530</td>
<td>Chemical Technology</td>
<td>3 cr.</td>
<td>(3 and 0)</td>
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<td>ChE 540</td>
<td>Graduate Laboratory</td>
<td>3 cr.</td>
<td>(0 and 9)</td>
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<td>ChE 545</td>
<td>Selected Topics in Chemical Engineering</td>
<td>3 cr.</td>
<td>(3 and 0)</td>
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<td>ChE 546</td>
<td>Selected Topics in Chemical Engineering</td>
<td>3 cr.</td>
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<td>ChE 547</td>
<td>Selected Topics in Chemical Engineering</td>
<td>3 cr.</td>
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<tr>
<td>ChE 552</td>
<td>Air Pollution Control Processes</td>
<td>3 cr.</td>
<td>(3 and 0)</td>
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<td>ChE 553</td>
<td>Industrial Air Hygiene</td>
<td>3 cr.</td>
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<tr>
<td>ChE 591</td>
<td>Research</td>
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<tr>
<td>ChE 592</td>
<td>Research</td>
<td>3 cr.</td>
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<td>ChE 603</td>
<td>Transport Phenomena</td>
<td>3 cr.</td>
<td>(3 and 0)</td>
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<tr>
<td>ChE 604</td>
<td>Chemical Engineering Thermodynamics</td>
<td>3 cr.</td>
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<td>ChE 605</td>
<td>Chemical Engineering Kinetics</td>
<td>3 cr.</td>
<td>(3 and 0)</td>
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<td>ChE 645</td>
<td>Selected Topics in Chemical Engineering</td>
<td>3 cr.</td>
<td>(3 and 0)</td>
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<td>ChE 646</td>
<td>Selected Topics in Chemical Engineering</td>
<td>3 cr.</td>
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<tr>
<td>ChE 647</td>
<td>Selected Topics in Chemical Engineering</td>
<td>3 cr.</td>
<td>(3 and 0)</td>
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<tr>
<td>ChE 691</td>
<td>Doctoral Research and Dissertation</td>
<td>Credit</td>
<td>to be arranged</td>
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</tbody>
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**CHEMISTRY**

**Mr. Brownley**

Mr. Carodemos, Mr. Dinwiddie, Mr. Hobson, Mr. Polk, Mr. Huffman,
Mr. Bishop, Mrs. Bishop, Mr. Fanning, Mr. Hodges, Mr. Landers,
Mr. Lindstrom, Mr. Marullo, Mr. Salley, Mr. Spencer

Ch 101—General Chemistry—4 cr. (3 and 3)

The purpose of this course is to give the student a general knowledge of the fundamentals of the science of chemistry through lectures, lecture experiments, and laboratory exercises. Consideration is given to the common substances.

Ch 102—General Chemistry—4 cr. (3 and 3)

A continuation of Ch 101.

Ch 181—General Chemistry—4 cr. (3 and 3)

Same as Ch 101 except that this honors section is open to students only by invitation.

Ch 182—General Chemistry—4 cr. (3 and 3)

Continuation of Ch 181.
CH 219—Chemical Principles—2 cr. (2 and 0)
A study of the fundamental laws and theories of inorganic chemistry based upon the periodic classification of the elements. The solution of chemical problems is stressed. Prerequisite: Ch 101 and 102.

CH 220—Elementary Organic Chemistry—4 cr. (3 and 3)
A one semester course in organic chemistry. Typical classes of organic compounds, both aliphatic and aromatic, are studied. Prerequisite: Ch 101 and 102.

CH 310—Agricultural Biochemistry—4 cr. (3 and 3)
A brief review of carbohydrate, fat and protein chemistry. The digestive action of the mouth, stomach and intestine is covered in detail. The chemical factors and theories relating to plant growth are discussed. The laboratory work consists of the analysis of natural products. Prerequisite: Ch 220.

CH 312—Analytical Chemistry—3 cr. (3 and 0)
The fundamental principles of analytical chemistry with emphasis on stoichiometry.

CH 314—Analytical Chemistry Laboratory—1 cr. (0 and 3)
The standard techniques of analytical chemistry—gravimetric, volumetric, and instrumental.

CH 316—Quantitative Analysis—5 cr. (3 and 6)
The fundamental principles of analytical chemistry and application of these principles in the laboratory. Volumetric and certain instrumental gravimetric procedures are employed. Prerequisite: Ch 101 and 102 and Organic Chemistry.

CH 318—Quantitative Analysis—3 cr. (3 and 0)
Covers the theory only of Ch 316 and is designed primarily for graduate students in other departments. Prerequisite: Ch 101 and 102 and permission of the instructor.

CH 323—Organic Chemistry—3 cr. (3 and 0)
An introductory course covering the principles of organic chemistry and the derivation of these principles from a study of the properties, preparations, and interrelationships of the important classes of organic compounds. Prerequisite: Ch 101 and 102.

CH 324—Organic Chemistry—3 cr. (3 and 0)
A continuation of Ch 323.

CH 325—Organic Chemistry Laboratory—2 cr. (0 and 6)
A study of the laboratory techniques involved in the synthesis, separation and purification, and characterization of typical examples of the classes of organic compounds. Prerequisite: Registration in Ch 323.

CH 326—Organic Chemistry Laboratory—2 cr. (0 and 6)
A continuation of Ch 325. Prerequisite: Registration in Ch 324.

CH 327—Organic Chemistry Laboratory—1 cr. (0 and 3)
A study of the synthesis and properties of typical examples of the classes of organic compounds. Prerequisite: Registration in Ch 323.

CH 328—Organic Chemistry Laboratory—1 cr. (0 and 3)
A continuation of Ch 327. Prerequisite: Registration in Ch 324.
**CH 331—Physical Chemistry—3 cr. (3 and 0)**
The student is given a foundation in the elements of thermodynamics and the kinetic theory. These theories are applied to the states of matter, solutions, and phase and reaction equilibria. **Prerequisite:** Math 205 and 206, Ch 316.

**CH 332—Physical Chemistry—3 cr. (3 and 0)**
A continuation of Ch 331 which will include theories of atomic and molecular structure, colloidal studies, kinetics of chemical processes, and electrochemistry.

**CH 333—Physical Chemistry Laboratory—2 cr. (0 and 6)**
Experiments designed to illustrate the physical chemistry theory studied in Ch 331. **Prerequisite:** Registration in Ch 331.

**CH 334—Physical Chemistry Laboratory—2 cr. (0 and 6)**
A continuation of Ch 333. **Prerequisite:** Registration in Ch 332.

**CH 339—Physical Chemistry Laboratory—1 cr. (0 and 3)**
Experiments are selected to be of maximum value to Chemical Engineering majors. **Prerequisite:** Registration in Ch 331.

**CH 340—Physical Chemistry Laboratory—1 cr. (0 and 3)**
A continuation of Ch 339. **Prerequisite:** Registration in Ch 332.

**CH 402—Inorganic Chemistry—3 cr. (3 and 0)**
A comprehensive survey of the field of inorganic chemistry through lectures and lecture experiments. Development of modern theories of atomic structure and valence, and a detailed study of the elements and their compounds, based on the periodic system and including both well-known and rarer elements. **Prerequisite:** Ch 216. **Suggested:** Ch 331 and 332.

**CH 411—Instrumental Analysis—4 cr. (2 and 6)**
Demonstration and operation of modern optical and electronic precision measuring devices as they apply to the processes and analytical, physical and organic chemistry. **Prerequisite:** Physical Chemistry.

**CH 421—Qualitative Organic Analysis—4 cr. (2 and 6)**
Systematic identification of pure organic compounds and mixtures. **Prerequisite:** Organic Chemistry.

**CH 423—General Biochemistry—3 cr. (3 and 0)**
A review of the basic organic chemistry of the amino acids, saccharides, and fatty acids; relations of these acids to the chemistry of proteins, polysaccharides, and lipids. Study of kinetics of enzymes and nucleic acids. Metabolic pathways of amino acids, carbohydrates, fats, phospholipids, and nucleic acids; hormonal control of metabolism, vitamins, and growth factors.

**CH 424—General Biochemistry—3 cr. (3 and 0)**
A continuation of Ch 423.

**CH 425—General Biochemistry Laboratory—1 cr. (0 and 3)**
Experiments selected to illustrate current methods used in biochemical research.

**CH 426—General Biochemistry Laboratory—1 cr. (0 and 3)**
A continuation of Ch 425.

**CH 431—Atomic and Molecular Structure—3 cr. (3 and 0)**
An introductory study of the principles of wave mechanics, hydrogen atom structure, approximate methods, molecular orbital and valence bond treatments
of bonding, hydridization, ligand-field theory, and relationships of structure to physical and chemical properties.

**CH 441—Glass Manipulation—2 cr. (0 and 6)**
A course designed to teach the fundamentals of glass manipulation and its application to the construction and repair of simple laboratory apparatus. **Prerequisite:** Senior standing.

**CH 442—Chemical Literature—2 cr. (1 and 3)**
This course is designed to give the student practice in the use of chemical literature, the writing of technical reports and the presentation of same before the faculty of the Department of Chemistry. **Prerequisite:** Junior standing in Chemistry.

**CH 443—Research Problems—3 cr. (0 and 9)**
Original investigation of an assigned problem in a fundamental branch of Chemistry. This work must be carried out under the supervision of a qualified member of the staff. **Prerequisite:** Senior standing in Chemistry.

**CH 444—Research Problems—3 cr. (0 and 9)**
A continuation of CH 443.

**CH 450T—Review of General Chemistry I—3 cr. (3 and 0)**
A lecture course designed to deal, in a mature and comprehensive manner, with the basic principles generally presented in a general chemistry course. Emphasis will be placed upon the explanation of observed facts in terms of modern atomic and molecular structure.

**CH 454—Inorganic Synthesis—2 cr. (0 and 6)**
A laboratory course designed to acquaint the student with various methods and techniques employed in the preparation and handling of inorganic compounds. **Prerequisite:** CH 402.

**CH 472—Organic Synthesis—4 cr. (2 and 6)**
The course is designed to teach the student techniques and principles as applied in a research laboratory. Both macro and semi-micro methods are used in the preparation of several organic compounds. **Prerequisite:** Organic Chemistry.

**CH 491—Introduction to Radiochemistry—3 cr. (2 and 3)**
A study of the natural and synthetic radioisotopes, including the consideration of atomic and nuclear structure, properties of radiation and tracer techniques and their application. The laboratory is concerned with the methods of detection and measurement of the various types of radiation and the various applications of tracer techniques. **Prerequisite:** Senior or Graduate standing and permission of instructor.

**CH 505—Inorganic Chemistry—3 cr. (3 and 0)**

**CH 507—Coordination Chemistry—3 cr. (3 and 0)**

**CH 511—Analytical Chemistry—3 cr. (3 and 0)**

**CH 512—Chemical Spectroscopic Methods—3 cr. (2 and 3)**

**CH 521—Organic Chemistry I—3 cr. (3 and 0)**

**CH 522—Organic Chemistry II—3 cr. (3 and 0)**

**CH 523—Organic Reaction Mechanisms—3 cr. (3 and 0)**
CH 524—Fundamental Principles of Polymer Chemistry—3 cr.
(3 and 0)
CH 525—Current Topics in Organic Chemistry—1 cr. (1 and 0)
CH 530—Physical Chemistry—3 cr. (3 and 0)
CH 531—Physical Chemistry I—3 cr. (3 and 0)
CH 532—Physical Chemistry II—3 cr. (3 and 0)
CH 533—Chemical Thermodynamics—3 cr. (3 and 0)
CH 534—Chemical Thermodynamics—3 cr. (3 and 0)
CH 535—Chemical Kinetics—3 cr. (3 and 0)
CH 541—Atomic and Molecular Structure—3 cr. (3 and 0)
CH 550T—A Review of General Chemistry II—3 cr. (2 and 3)
CH 551—Chemistry Seminar—0 to 2 cr.
CH 552—Chemistry Seminar—0 to 2 cr.
CH 591—Research—3 cr.
CH 592—Research—3 cr.
CH 621—Heterocyclic Compounds—3 cr. (3 and 0)
CH 622—Stereochemistry—3 cr. (3 and 0)
CH 623—Chemistry of Natural Products—3 cr. (3 and 0)
CH 624—Current Trends in Organic Chemistry—1 cr. (1 and 0)
CH 625—Chemistry of Natural Products—3 cr. (3 and 0)
CH 632—Colloid Chemistry—3 cr. (3 and 0)
CH 650—Microanalytical Techniques—3 cr. (1 and 6)
CH 691—Doctoral Research and Dissertation—Credit to be arranged

CIVIL ENGINEERING

MR. MOORE
MR. RICH, MR. TRIVELY, MR. FORD, MR. McCORMAC, MR. MCCUTCHEON,
MR. ROSTRON, MR. ABERNATHY

CE 200—Elementary Surveying—2 cr. (1 and 3)
Field work and computations for simple surveys involving use of all basic
surveying instruments. Prerequisite: Math 105.

CE 203—Topographic Surveying and Mapping—1 cr. (0 and 3)
Field and office work necessary to make a complete topographic map, includ-
ing contours of a prescribed area. For forestry students only. Prerequisite:
Math 105, CE 200.

CE 301—Surveying—3 cr. (2 and 3)
Care and adjustment of all surveying instruments; mathematical principles
involved in making surveys; field and office work necessary to make a detailed
map, including contours of a prescribed area; special surveying problems,
including solar and stellar observations. Prerequisite: CE 200, Math 105.
(CE 301 taught in summer only.)
CE 305—Route Surveying—3 cr. (2 and 3)
Special problems in connection with the location of a route for a railroad, highway, canal, sewer, water main or transmission line; theory of simple, compound and reversed curves; parabolic curves, transition, spiral, vertical curves, railroad turnouts; computations of earthwork. Field work includes a route survey for a highway. Prerequisite: Accompanied or preceded by CE 301. (CE 305 taught in summer only.)

CE 308—Structural Analysis—4 cr. (3 and 3)
Analytical analysis of statically determinate beams, trusses, and frames, including the construction of shear and moment diagrams, influence lines, and thorough discussion of moving loads. Computation of slopes and deflections of beams by area-moment and conjugate beam methods. Analysis of statically indeterminate beams and one-story frames by moment distribution and slope deflection. Prerequisite: EM 304.

CE 319—General Photogrammetry—3 cr. (2 and 3)
Fundamentals of mapping by the use of aerial photographs; characteristics, production and use of aerial photographs; study of the operation of popular photogrammetric instruments including aerial cameras, stereoscopic viewing and plotting equipment; practice in the use of stereocomparagraph and multiplex plotting instruments; scale, tilt, and coordinate calculations; construction of photomosaics. Prerequisite: CE 301 and Junior standing.

CE 404—Concrete Structures—4 cr. (3 and 3)
Design of basic concrete members using the elastic theory. Introduction to prestressed concrete and ultimate design. Prerequisite: CE 308 and Senior standing.

CE 405—Environmental Engineering—4 cr. (3 and 3)
A consideration of the water and air contacts in the human environment, an evaluation of their effect on man’s well-being, and the analysis and design of engineering systems used in their control. Prerequisite: EM 401 and Senior standing.

CE 406—Transportation Engineering—3 cr. (2 and 3)
Elements of design, location and construction of highways, railroads, airports and other transportation facilities, including a study of the various paving and roadbed materials, earthwork operations, soil and drainage problems involved in such construction. Planning and administration of various transportation systems. Prerequisite: CE 301, CE 305, preceded or accompanied by CE 414, and Senior standing.

CE 407—Structural Design—4 cr. (3 and 3)
Design and detail of the components of wood and steel structures. Prerequisite: CE 308 and Senior standing.

CE 408—Materials and Methods of Construction—3 cr. (3 and 0)
A survey of the principal materials, methods and equipment used in the construction industry. Prerequisite: Senior standing.

CE 413—Water and Waste Treatment Technology—3 cr. (2 and 3)
Theory and control of the physical, chemical and biological processes employed in water and waste water treatment. Prerequisite: CE 405 and Senior standing.
CE 414—SOIL MECHANICS—3 cr. (2 and 3)
Mechanical and physical properties of soils and their relation to soil action in problems of engineering, such as classification, permeability, shearing strength, consolidation, stress distribution and bearing capacity of soils. Prerequisite: EM 304 and Senior standing.

CE 416—STRUCTURAL DESIGN—4 cr. (3 and 3)
Design and detail of the components of wood, steel and concrete structures. For Architectural students only. Prerequisite: CE 308.

CE 420—CONCRETE TECHNOLOGY—1 cr. (0 and 3)
Investigation and selection of aggregates for concrete; latest methods of design of concrete mixes; field control and adjustments; air-entrained concrete; field trips to nearby construction jobs. Prerequisite: Preceded or accompanied by CE 404.

CE 422—ENGINEERING RELATIONS—3 cr. (3 and 0)
Business, legal and ethical relations in engineering practice. Prerequisite: Econ 201 and Senior standing.

CE 434—CONSTRUCTION COSTS AND ESTIMATES—3 cr. (2 and 3)
Interpretation of specifications and plan reading necessary for the proper estimation of quantities of materials and costs of engineering structures. The course is presented from both the designer’s and the constructor’s viewpoint in order to fit the young engineer with the essential details an inspector or a construction engineer should have at his command. Prerequisite: Senior standing.

CE 453—ADVANCED STRUCTURAL ANALYSIS—3 cr. (3 and 0)
Study of slopes and deflections of beams and trusses by energy methods. Analysis of statically indeterminate structures and construction of influence lines by virtual-work method. Application of moment distribution and slope deflection methods to haunched beams. Prerequisite: CE 308 and Senior standing.

CE 501—STRUCTURAL ENGINEERING I—3 cr. (2 and 3)
CE 502—STRUCTURAL ENGINEERING II—3 cr. (2 and 3)
CE 503—MODEL ANALYSIS—3 cr. (2 and 3)
CE 504—THEORY AND DESIGN OF THIN PLATES—3 cr. (3 and 0)
CE 505—THEORY AND DESIGN OF THIN SHELLS—3 cr. (3 and 0)
CE 510—HIGHWAY SAFETY AND TRAFFIC CONTROL—2 or 3 cr. (2 and 0) or (3 and 0)

CE 511—HIGHWAY DESIGN—3 cr. (2 and 3)
CE 512—BITUMINOUS PAVING MATERIALS—3 cr. (2 and 3)
CE 513—HIGHWAY AND AIRPORT PAVEMENT DESIGN—3 cr. (3 and 0)
CE 519—HIGHWAY RESEARCH—2 to 4 cr.
CE 520—CONCRETE MIXES AND MATERIALS—3 cr. (2 and 3)
CE 531—SOIL ENGINEERING—3 cr. (2 and 3)
CE 541—SANITARY ENGINEERING ANALYSIS—3 cr. (2 and 3)
Description of Courses

CE 542—Sanitary Engineering Processes—3 cr. (3 and 0)
CE 543—Unit Operations of Sanitary Engineering—3 cr. (3 and 0)
CE 544—Unit Processes Laboratory—1 cr. (0 and 3)
CE 545—Unit Operations Laboratory—1 cr. (0 and 3)
CE 589—Special Problems I—1-3 cr.
CE 590—Special Problems II—1-3 cr.
CE 591—Research—3 cr.
CE 592—Research—3 cr.

DAIRY SCIENCE

Mr. King

Mr. Hurst, Mr. Brannon, Mr. Henningson, Mr. Janzen, Mr. Lazar

Dy Sc 201—Introductory Dairying—3 cr. (2 and 3)

A course designed to give a practical working knowledge of Dairy husbandry and dairy products. Studies include history of dairying, dairy breeds, feeds and feeding, judging dairy animals, dairy farm buildings, quality milk production, testing milk and some of its products, the manufacture of milk products and the value of milk and milk products.

Dy Sc 302—Dairy Technology and Engineering—3 cr. (2 and 3)

Major subjects covered are physical and chemical properties of milk, power transmission, electrical power and equipment, hydraulics and pumping, heat measurement and control, steam and its use in the dairy, principles of refrigeration, insulation and cold storage rooms, heaters and coolers, storage tanks, ice cream freezers, homogenizers, pasteurizers, concentrators, equipment maintenance, and plant design. Prerequisite: Junior standing.

Dy Sc 303—The Chemical and Physical Nature of Milk—3 cr. (2 and 3)

The nature and properties of the major and minor constituents of milk, the effect of chemical and physical treatment on milk constituents, and analytical methods necessary to determine the composition and properties of milk and its constituents. The philosophy and development of quality control.

Dy Sc 304—Judging Dairy Products—2 cr. (1 and 3)

Flavor and physical qualities of ice cream, milk, cheese and butter are related to processing methods and market acceptance. A concept of quality is formed through examination of various grades of each product. Actual practice in taste panels illustrates their use in the food industry. Prerequisite: Junior standing.

Dy Sc 307—Market Milk—3 cr. (2 and 3)

Composition, procurement, processing, distribution, quality control, public health aspects, basis chemistry and bacteriology of industrial milk supplies and cultured products. Prerequisite: Dy Sc 201.

Dy Sc 310—Dairy Cattle Judging—1 cr. (0 and 3)

Students are given an understanding of dairy form, breed type, and relations between form and function of dairy cattle. Emphasis is placed on the score card, show ring requirements and classifications, fitting dairy cattle for show and sale, values as influenced by form, buying dairy cattle, practice in judging
Brown Swiss, Guernsey, Holstein and Jersey cattle of all ages. Prerequisite: Junior standing.

DY Sc 351—Advertising and Merchandising—3 cr. (3 and 0)
General broad subjects covered are development of advertising, economics and functions of advertising, truth in advertising, research of product and market, channels of trade, comparison of advertising and personal selling, present-action and future-action advertising, the appeals, writing the copy, trade marks and slogans, illustrations, typography and printing, color, layouts, mediums, agencies, campaigns testing, and dealer relations. Prerequisite: Junior standing.

DY Sc 403—Animal Nutrition—3 cr. (3 and 0)
A basic understanding of the chemistry and physiology of digestion and metabolism of carbohydrates, lipids, proteins, minerals and vitamins by farm animals. The effects of antibiotics and other additives are included. Maintenance, growth, reproduction and lactation are studied in relation to the physiological requirements. Prerequisite: Ch 220 and AH 301.

DY Sc 404—Dairy Plant Management—3 cr. (2 and 3)
The functions and operations and the application of business and factory management practices in the dairy plant. The course also includes the manufacture of creamery butter and the processing of soft cheeses. Prerequisite: Dy Sc 201 and 302.

DY Sc 405—Dairy Manufactures—4 cr. (3 and 3)
The principles and practice of the manufacture of ice cream and related dairy products, the principles of the manufacture of condensed and evaporated milks and milk powders, and the physical, chemical and biological factors involved. Prerequisite: Dy Sc 201.

DY Sc 407—Cheese and Butter Manufacture—3 cr. (2 and 3)
Theory and practice of the manufacture, curing and marketing of Blue, Cheddar, Swiss and other cured cheeses. Principles and practices of creamery buttermaking with emphasis on butter plant management. Students will become familiar with grading, neutralizing, pasteurizing, and churning cream. Prerequisite: Senior standing and permission of instructor for admission of juniors.

DY Sc 409—Dairy Science Seminar—2 cr. (2 and 0)
Special research problems in production and manufactures are studied. Individual topics not fully covered in class work are assigned for special report before class and some members of Dairy Science Staff. Prerequisite: Senior standing.

DY Sc 410—Dairy Science Seminar—2 cr. (2 and 0)
A continuation of Dy Sc 409 with emphasis on current research literature and research methods. Prerequisite: Senior standing.

DY Sc 452—Dairy Cattle Feeding and Management—3 cr. (2 and 3)
Fundamental principles in the care, feeding, and management of dairy cattle of all ages. Topics include general considerations in selecting a breed and the individual cow, calf raising, growth and development of dairy heifers, care and management of the milking herd and feeding for milk production. Prerequisite: Senior standing.
Dy Sc 453—Reproduction of Farm Animals—3 cr. (3 and 0)
A study of basic reproductive physiology in cattle, sheep, and swine. Emphasis will be placed on factors affecting fertility and sterility. Offered in alternate years. Prerequisite: Senior standing or by permission of the instructor for admission of juniors.

Dy Sc 458—Artificial Insemination of Farm Animals—3 cr. (2 and 3)
Artificial insemination as applied to cattle, sheep, and swine. Studies are made of semen collection and its subsequent evaluation and processing. Practical work includes artificial insemination practice and study of breeding organizations. Offered in alternate years. Prerequisite: Senior standing or by permission of the instructor for admission of juniors.

Dy Sc 501—Topical Problems—1 to 3 cr.

Dy Sc 502—Genetics of Dairy Cattle Improvement—3 cr. (3 and 0)

Dy Sc 503—Physiology of Reproduction and Milk Secretion—3 cr. (3 and 0)

Dy Sc 504—Endocrinology—3 cr. (3 and 0)

Dy Sc 505—Newer Knowledge of Dairy Nutrition—3 cr. (3 and 0)

Dy Sc 507—Fermented Dairy Products—3 cr. (2 and 3)

Dy Sc 508—Industrial Dairy Science—3 cr. (3 and 0)

Dy Sc 591—Research—3 cr.

Dy Sc 592—Research—3 cr.

ECONOMICS

Mr. Macaulay, Mr. Hill, Mr. Whitten, Miss Brown, Mr. Pearce,*
Mr. Skelton,* Mr. C. B. Thompson, Mr. E. A. Thompson,
Mr. Wheeler, Mr. Bauff, Mr. Baugher,
Mr. Farnsworth, Mr. Stepp

Econ 201—Principles of Economics—3 cr. (3 and 0)
The fundamental principles of production, distribution and consumption with special consideration of their relationships to business organizations and governmental regulations in our economy.

Econ 202—Principles of Economics—3 cr. (3 and 0)
Continuation of Econ 201 with emphasis on current economic problems. Prerequisite: Econ 201.

Econ 301—Labor Problems—3 cr. (3 and 0)
The economics of the labor market, the problems of the industrial worker, and the methods of adjusting labor-management disputes. Prerequisite: Econ 201.

Econ 302—Money and Banking—3 cr. (3 and 0)
Consideration of monetary systems, foreign exchange, credit instruments, and financial institutions; credit control, monetary stabilization, banking regulation and reform. Prerequisite: Econ 201 and 202.

* On leave.
Econ 305—Investment Analysis—3 cr. (3 and 0)
A study of technique useful in analyzing alternative investment opportunities, with emphasis on corporate securities. Investment planning and portfolio management are considered. Prerequisite: Econ 201.

Econ 306—Risk and Insurance—3 cr. (3 and 0)
Studies the nature of risk and the role of insurance in risk management from individual and business viewpoints by considering insurance carriers, contracts, underwriting and regulation. Prerequisite: Econ 201.

Econ 308—Collective Bargaining—3 cr. (3 and 0)
A study of the practices, procedures, legal foundations, and legal structure associated with collective bargaining. The form and content of the labor contract, the grievance machinery, and the mediation and arbitration institutions will also be studied. Prerequisite: Econ 201.

Econ 312—Commercial Law—3 cr. (3 and 0)
An introduction to business law with primary attention given to contracts, agency and negotiable instruments and sales. Prerequisite: Junior standing.

Econ 313—Commercial Law—3 cr. (3 and 0)
Continuation of Econ 312 with emphasis on business organization, personal and real property, trade regulations and related topics. Prerequisite: Econ 312.

Econ 314—Intermediate Economic Theory—3 cr. (3 and 0)
An analytical study of the basic concepts of value and distribution under alternative market conditions. Prerequisite: Econ 201 and 202.

Econ 403—Development of Economic Thought—3 cr. (3 and 0)
Considers writings of economists, the problems they faced and the solutions offered, and the role of their theories in present day economic theory. Prerequisite: Econ 201 and permission of the instructor.

Econ 404—Comparative Economic Systems—3 cr. (3 and 0)
A comparative analytical and historical study of the principal economic systems which have been important in the modern world including, among others, capitalism and socialism. Prerequisite: Econ 201 and permission of instructor.

Econ 406—Business Fluctuations—3 cr. (3 and 0)
A study of the internal and external causes of depressions and inflations, of the interrelationships between causes, and the possible remedies for the situation. Prerequisite: Econ 201 and 202 and permission of the instructor.

Econ 407—National Income and Employment Analysis—3 cr. (3 and 0)
An intensive study of selected economic theories with special emphasis on income and employment. Part of the course is devoted to the analysis of national income accounts and income. Prerequisite: Econ 201 and permission of instructor.

Econ 412—International Trade and Economic Development—3 cr. (3 and 0)
The organization and operation of the international economy with emphasis on the theory and practice of international trade, international investment, and the development of underdeveloped nations. Prerequisite: Econ 201 and 202.
Econ 416—Development of the Modern Economy—3 cr. (3 and 0)
An analysis of the historical forces and influences which have contributed to
the emergence and development of the modern economy. Prerequisite: Econ
201 and permission of instructor.

Econ 420—The Economics of Taxation—3 cr. (3 and 0)
A study of the equity, welfare, and incentive effects of taxation, the effect
of taxes on resource allocation, investment, and economic growth; and certain
problems, such as averaging, taxation of public utilities, and tax reform.
Prerequisite: Econ 314 or equivalent.

Econ 500—Advanced Economic Analysis—3 cr. (3 and 0)
Econ 510—Seminar in Economic Analysis—3 cr. (3 and 0)
Econ 512—Seminar in the Development of Economic Thought—3 cr.
(3 and 0)
Econ 521—Economic Theory I—3 cr. (3 and 0)
Econ 522—Economic Theory II—3 cr. (3 and 0)

EDUCATION

Mrs. Hardie, Mr. Landrith, Mr. Black, Mr. Davis, Mr. Ware, Mr. Rodgers

Ed 201—Introduction to American Education—3 cr. (3 and 0)
An introduction to the teaching profession and the social, historical, and
philosophical foundations of public education in the United States.

Ed 302—Educational Psychology—3 cr. (3 and 0)
A study of the nature, capacities, equipment, growth and development of
the learner.

Ed 327—Teaching of Science in the Elementary School—3 cr.
(3 and 0)
A study of methods and materials for teaching science to elementary school
children. (Offered in Summer Sessions only.)

Ed 334—Child Growth and Development—3 cr. (3 and 0)
A study of the physical and emotional growth and development of the child.

Ed 335—Adolescent Growth and Development—3 cr. (3 and 0)
A study of the physical and emotional growth and development of the
adolescent.

Ed 371—Language Arts in the Elementary School—3 cr. (3 and 0)
A study designed to make the subject areas of language practical and ef-
fective tools; includes reading, language usage, spelling, handwriting and
literature. (Offered in Summer Sessions only.)

Ed 372—Arts and Crafts for the Elementary Child—3 cr. (3 and 0)
A study of basic art principles and the uses of various art materials and
media. (Offered in Summer Sessions only.)

Ed 381—Methods and Materials of Teaching in Elementary Schools—
3 cr. (3 and 0)
A study of the latest methods and techniques for presenting materials of
instruction; includes special techniques, observation and evaluation of teaching
elementary school children. (Offered in Summer Sessions only.)
Ed 386—Health Education in the Elementary Schools—3 cr.
(3 and 0)
A study of health practices which are basic to effective living at home and at school. (Offered in Summer Sessions only.)

Ed 406—History and Philosophy of Education—3 cr. (3 and 0)
An analysis of the development of modern education practices and philosophies with emphasis upon the historical and philosophical development in the United States.

Ed 412—Directed Teaching in High School Subjects—6 cr. (1 and 15)
A program of supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for prospective teachers to secure experiences in the subject area of their choice. (Enrollment is subject to individual approval of instructor in charge and is limited to seniors or graduate students who have completed prerequisite courses and who have the accumulated grade-point ratio necessary for graduation.)

Ed 424—Techniques of Teaching—3 cr. (3 and 0)
A study of instructional practices used in the secondary schools with emphasis on the findings of research as related to instructional techniques.

Ed 458—Health Education—3 cr. (3 and 0)
A study of the information needed for effective cooperation with parents, physicians and public health agencies in the promotion and improvement of community health, including problems of personal hygiene, health records, immunization, and control of communicable disease.

Ed 460—Curriculum Development in the Elementary School—3 cr.
(3 and 0)
An analysis and evaluation of newer practices in curriculum planning in the elementary school. (Offered in Summer Sessions only.)

Ed 494—School and Community Relationships—3 cr. (3 and 0)
A study of the interdependence of the school and community, with emphasis on educational implications. (Offered in Summer Sessions only.)

Ed 497—Audio-Visual Aids in Education—3 cr. (3 and 0)
A study of the techniques and uses of audio-visual aids in improving teaching effectiveness.

Ed 503—Advanced Methods in Teaching—3 cr. (3 and 0)

Ed 505—Principles of Guidance—3 cr. (3 and 0)

Ed 508—Educational Tests and Measurements—3 cr. (3 and 0)

Ed 509—Analysis of the Individual—3 cr. (3 and 0)

Ed 510—Techniques of Counseling—3 cr. (3 and 0)

Ed 511—Public School Administration (Finance)—3 cr. (3 and 0)

Ed 513—Educational and Vocational Informational Services and Placement—3 cr. (3 and 0)

Ed 518—Organization and Administration of Elementary School—3 cr. (3 and 0) (Offered in Summer Sessions only.)
Description of Courses

Ed 530—Techniques of Supervision—The Public Schools—3 cr. (3 and 0) (Offered in Summer Sessions only.)

Ed 531—Public School Evaluation—3 cr. (3 and 0) (Offered in Summer Sessions only.)

Ed 590—Introduction to Research in Education—3 cr. (3 and 0)

**ELECTRICAL ENGINEERING**

Mr. Thurston

Mr. Ball, Mr. Broyles, Mr. Goodin, Mr. Kersey, Mr. Long, Mr. Martin, Mr. Poe, Mr. Zink, Mr. Brittain, Mr. Fitch, Mr. Rochester

EE 214—Electric Circuits and Fields—3 cr. (3 and 0)
The fundamental theory of electric and magnetic circuits and fields. **Prerequisite:** Math 206, Phys 212 and 214 or enrollment in Math 206, Phys 212, 214; Sophomore standing.

EE 284—Electric Circuits and Fields—3 cr. (3 and 0)
Honors section in EE 214.

EE 301—Electronics in Engineering—3 cr. (3 and 0)
An introduction to the subject of electronics for students not majoring in engineering or physics. Vacuum and gas-filled tubes, transistors, rectification, amplification, feedback, the cathode-ray oscilloscope, and simple instrumentation techniques. **Prerequisite:** Two semesters of physics.

EE 303—Introduction to Electrical Engineering—3 cr. (3 and 0)
Electric and magnetic circuits, phasor algebra as applied to a-c circuits, machinery, electronics. For students in Industrial Education and Industrial Management. **Prerequisite:** Math 106, Phys 202 and 204.

EE 307—Basic Electrical Engineering—3 cr. (3 and 0)
Electrical engineering for students who need a sound background in the subject, but who are not planning to specialize in this field. The first term includes a study of D.C. and A.C. circuits, magnetic phenomena, and principles of electrical machinery. **Prerequisite:** Math 206, Phys 212 and 214.

EE 308—Basic Electrical Engineering—3 cr. (3 and 0)
A continuation of EE 307. Topics include a more complete study of rotating machinery, basic electromechanical control systems, instrumentation, and fundamentals of electronics. **Prerequisite:** EE 307.

EE 309—Electrical Engineering Laboratory—1 cr. (0 and 3)
A laboratory course designed to accompany EE 307. **Prerequisite:** EE 307 or enrollment in EE 307.

EE 310—Electrical Engineering Laboratory—1 cr. (0 and 3)
A laboratory course designed to accompany EE 308. **Prerequisite:** EE 308 or enrollment in EE 308.

EE 312—Electrical Machinery I—3 cr. (3 and 0)
A comprehensive study of the theory, construction, and operating characteristics of rotating machines and transformers. **Prerequisite:** EE 315 and enrollment in EE 316.

* On leave.
EE 313—Electric and Magnetic Fields—2 cr. (2 and 0)
A continuation of EE 214, with emphasis on ferromagnetic systems such as are encountered in energy conversion devices. Electrostatic fields are also considered. **Prerequisite:** EE 214.

EE 314—Electrical Machinery I Laboratory—1 cr. (0 and 3)
A laboratory course designed to accompany EE 312. **Prerequisite:** Enrollment in EE 312.

EE 315—Alternating-Current Circuits—4 cr. (3 and 3)
A comprehensive study of alternating-current fundamentals. The circuits are analyzed by use of complex algebra, and matrices are introduced for multiloop and multi-node networks. One three-hour calculation period each week. **Prerequisite:** EE 214.

EE 316—Alternating-Current Circuits—3 cr. (3 and 0)
A continuation of EE 315. Polyphase circuits are covered, both balanced and unbalanced. The Fourier analysis is presented, followed by introduction of the Laplace transformation for responses to transient inputs. A study of elementary synthesis includes the canonical forms of Foster and Cauer. **Prerequisite:** EE 315 and EE 317.

EE 317—Measurements Laboratory—1 cr. (0 and 3)
A first laboratory course in electrical engineering. Basic measuring instruments are used on A.C., D.C., and magnetic circuits, and practice is obtained in securing data and in preparing reports. **Prerequisite:** Enrollment in EE 313 and EE 315.

EE 320—Electronics I—3 cr. (3 and 0)
Basic electronics. Includes principles of solid state and high-vacuum electronic devices, with some discussion of the physics involved as well as the circuitry. **Prerequisite:** EE 308, EE 310, or enrollment in EE 316 and EE 322.

EE 321—Principles of Illumination—3 cr. (3 and 0)
An elective course planned to acquaint engineering and architecture students with the basic principles of illumination, and to give them some experience in the design and layout of lighting installations. **Prerequisite:** Phys 202 and Phys 204, or equivalent.

EE 322—Electronics I Laboratory—1 cr. (0 and 3)
A laboratory course designed to accompany EE 320. **Prerequisite:** Enrollment in EE 320.

EE 401—Seminar—1 cr. (1 and 0)
Discussions on topics from current scientific periodicals and on research and developments in industry. A library research paper is prepared as part of the course work. **Prerequisite:** Senior standing.

EE 402—Engineering Analysis—1 cr. (0 and 3)
The application of engineering principles and methods to the study of typical problems that arise in the various fields of electrical engineering. **Prerequisite:** EE 401 and Senior standing.

EE 407—Electronics II—3 cr. (3 and 0)
A continuation of EE 320, including application to industrial electronics and communications. **Prerequisite:** EE 320, EE 322, enrollment in EE 409, and Senior standing.
202 Description of Courses

EE 409—Electronics II Laboratory—1 cr. (0 and 3)
A laboratory course designed to accompany EE 407. Prerequisite: Enrollment in EE 407 and Senior standing.

EE 410—Feedback Control Systems—3 cr. (3 and 0)
Study of closed-loop control systems by use of the Laplace transform and transfer function methods. Root-locus, Nyquist, Bode, and Nichols diagrams are used. Prerequisite: EE 316 and Senior standing.

EE 415—Advanced Circuits—3 cr. (3 and 0)
Filter theory, transmission-line theory, vector analysis, and introduction to time-variant fields. Prerequisite: EE 316 and Senior standing.

EE 417—Electrical Machinery II—3 cr. (3 and 0)
A continuation of EE 312. Prerequisite: EE 312, enrollment in EE 419, and Senior standing.

EE 419—Electrical Machinery II Laboratory—1 cr. (0 and 3)
A laboratory course designed to accompany EE 417. Prerequisite: Enrollment in EE 417 and Senior standing.

EE 420—Power System Analysis—3 cr. (3 and 0)
Studies of transmission lines using lumped and distributed constants. Symmetrical components and their use in system fault calculations. Introductory theory of power system stability. Prerequisite: Enrollment in or credit for EE 417 and Senior standing.

EE 427—Advanced A-C Machinery—3 cr. (3 and 0)
Supplementary to EE 312 and EE 417 and covering special and more complex features of rotating machinery and control drive systems. Prerequisite: EE 312, EE 417, and Senior standing.

EE 431—Electronics III—3 cr. (3 and 0)
Wave-shaping, pulse techniques, microwave techniques, antennas, and communication systems. Prerequisite: EE 407, concurrent registration in EE 433, and Senior standing.

EE 433—Electronics III Laboratory—1 cr. (0 and 3)
A laboratory course designed to accompany EE 431. Prerequisite: Concurrent registration in EE 431 and Senior standing.

EE 436—Radiation and Wave Propagation—3 cr. (3 and 0)
Electromagnetic fields, boundary-value problems, Maxwell’s equations, guided waves, and radiation. Prerequisite: EE 415 and Senior standing.

EE 438—Industrial Electronics Laboratory—1 cr. (0 and 3)
A laboratory course designed to accompany EE 434. Prerequisite: Enrollment in EE 434.

EE 501—Transients in Linear Systems—3 cr. (3 and 0)
EE 510—Closed-Loop Control Systems—3 cr. (3 and 0)
EE 511—Electric Power Stations—3 cr. (3 and 0)
EE 513—Power System Stability—3 cr. (3 and 0)
EE 515—Network Analysis and Synthesis I—3 cr. (3 and 0)
EE 516—Network Analysis and Synthesis II—3 cr. (3 and 0)
EE 518—Electronic Circuits—3 cr. (3 and 0)
EE 519—Electronic Circuits Laboratory—1 cr. (0 and 3)
EE 520—Advanced Electronic Circuits—4 cr. (3 and 3)
EE 521—Radiation and Wave Propagation—3 cr. (3 and 0)
EE 525—Solid-State Electronics—3 cr. (3 and 0)
EE 528—Pulse Techniques—3 cr. (3 and 0)
EE 529—Pulse Techniques Laboratory—1 cr. (0 and 3)
EE 530—Pulse Techniques—4 cr. (3 and 3)
EE 591—Research—3 cr.
EE 592—Research—3 cr.

ENGINEERING GRAPHICS
Mr. Bradbury
Mr. Banister, Mr. Hammond, Mr. Jameson, Mr. McHugh,
Mr. Carter, Mr. Clement

EG 101—Freehand Sketching—1 cr. (0 and 3)
Principles of technical sketching, including the development of skills in
technical lettering and freehand orthographic and pictorial drawing.

EG 105—Engineering Graphics—2 cr. (0 and 6)
This course is to acquaint students of management with the engineering
language in order to make more understandable the necessary communication
which must occur between management and the engineering profession.

EG 106—Engineering Graphics—2 cr. (0 and 6)
A continuation of EG 105 with the last portion of the course devoted to the
use of graphics by management for the analysis and presentation of data. Pre-
requisite: EG 105.

EG 107—Engineering Graphics—2 cr. (0 and 6)
A study of the graphical language with emphasis on drawing as a means of
engineering communication and as preparation for engineering design. Tech-
nical sketching and mechanical drawing are used to develop a basic means for
the graphical communication of ideas.

EG 108—Engineering Graphics—2 cr. (0 and 6)
Descriptive geometry, vector geometry, graphical solutions, with problems
selected to develop engineering graphics as a basic tool for the solution of
engineering problems. Prerequisite: EG 107.

EG 202—Advanced Graphics for Engineers—2 cr. (1 and 3)
The application of rational and empirical equations, functional scales,
nomography, and graphical calculus to the solution of mathematical problems
from the several fields of engineering. Prerequisite: Sophomore standing,
EG 108, registration in Math 205.
ENGINEERING MECHANICS

MR. MOORMAN
MR. NOWACK, MR. CASTRO,* MR. DIRKSEN, MR. GAMBRELL,*
MR. LAW, MR. MITCHELL, MR. ULDRICK *

EM 302—ENGINEERING MECHANICS (STATICS)—3 cr. (3 and 0)
Forces and force systems and their external effects on bodies; principally the
condition of equilibrium. The concept of free body analysis as an analytical
tool is emphasized. Special topics include centroids and moments of inertia.
**Prerequisite:** Phys 211, concurrent registration in Math 206.

EM 303—ENGINEERING MECHANICS (DYNAMICS)—3 cr. (3 and 0)
A continuation of EM 302. The two principal topics are kinematics and the
effects of force systems in producing accelerated motion of particles and bodies
of finite size. Emphasis is placed on the fundamental laws of motion and
analytical techniques in their application to engineering problems. **Prerequisite:**
EM 302 and Math 206.

EM 304—MECHANICS OF MATERIALS—3 cr. (3 and 0)
The relationships between external loads on solid bodies or members and
the resulting internal effects and dimension changes, including the derivation
of rational formulas for stresses and deformations and the identification and use
of important physical properties of engineering materials. **Prerequisite:** EM
302 or 306 and Math 206.

EM 305—MECHANICS OF MATERIALS LABORATORY—1 cr. (0 and 3)
Theoretical relationships considered in EM 304 are verified. Students observe
the behavior under load and the failure of engineering materials; identify and
evaluate physical properties of materials important to design and manufacturing
processes; and are acquainted with various testing methods, testing machines,
and instruments. **Prerequisite:** Must be accompanied or preceded by EM 304.

EM 306—VECTOR ENGINEERING MECHANICS (STATICS)—3 cr. (3 and 0)
A study of forces and force systems and their external effects on bodies;
principally, the condition of equilibrium. The techniques of vector mathematics
are employed, and the rigor of physical analysis is emphasized. **Prerequisite:**
Phys 211, concurrent registration in Math 206.

EM 307—VECTOR ENGINEERING MECHANICS (DYNAMICS)—3 cr. (3 and 0)
A continuation of EM 306. The principal topics are kinematics and kinetics
of particles and bodies of finite size. Techniques of vector mathematics are
employed. **Prerequisite:** EM 306, Math 206.

EM 401—FLUID MECHANICS—3 cr. (3 and 0)
A fundamental study of the behavior of fluids at rest or in motion. Emphasis
is placed upon a rational, analytical approach from which are developed basic
principles of broad applicability to all fields of engineering. **Prerequisite:**
EM 303 or 307.

EM 403—FLUID MECHANICS LABORATORY—1 cr. (0 and 3)
The principles developed in EM 401 are verified and demonstrated. Familiarization
with orderly techniques in organizing and reporting results of

* On leave.
experimental investigations and with the use of instruments and equipment is afforded. **Prerequisite:** Must be accompanied or preceded by EM 401.

**EM 450—MECHANICAL VIBRATIONS—3 cr. (3 and 0)**

Basic theory of mechanical vibrations with applications to problems including those of free vibrations with and without damping; forced vibrations, systems of one, two, and many degrees of freedom. **Prerequisite:** EM 303 or 304, 307, and Math 306.

**EM 460—HYDROLOGY—2 or 3 cr. (2 or 3 and 0)**

The principles concerning the occurrence of natural water and engineering practices in dealing with it in the design of facilities for water supply, flood control, power development, and other purposes. **Prerequisite:** Approval of instructor.

**EM 462—WATER POWER ENGINEERING—2 or 3 cr. (2 or 3 and 0)**

Principles and practices involved in the investigating and planning of hydraulic power developments and the selection of hydraulic machinery. **Prerequisite:** EM 460 or special approval of instructor.

**EM 464—FLOW IN OPEN CHANNELS—2 or 3 cr. (2 or 3 and 0)**

Consideration of open channel flow problems, including: the hydraulic jump, backwater curves, bends, transitions and obstructions, and special methods of flood routing. **Prerequisite:** EM 401 and approval of instructor.

**EM 470—EXPERIMENTAL STRESS ANALYSIS—3 cr. (2 and 3)**

Experimental analysis of stress fields and determination of maximum principal stresses in deformable bodies. Emphasis is on the theoretical consideration in the reduction of data as well as the obtaining of data. Methods studied include photoelasticity, electrical resistance strain gages, brittle lacquer, and birefringent coatings. **Prerequisite:** EM 304 and permission of instructor.

**EM 501—EXPERIMENTAL STRESS ANALYSIS—ADVANCED—3 cr. (2 and 3)**

**EM 521—CONTINUUM MECHANICS—3 cr. (3 and 0)**

**EM 525—ADVANCED MECHANICS OF MATERIALS—3 cr. (3 and 0)**

**EM 531—THEORY OF ELASTICITY 1—3 cr. (3 and 0)**

**EM 532—THEORY OF ELASTICITY II—3 cr. (3 and 0)**

**EM 536—THEORY OF PLASTICITY—3 cr. (3 and 0)**

**EM 551—INTERMEDIATE FLUID MECHANICS—3 cr. (3 and 0)**

**EM 561—HYDROLOGY—3 cr. (3 and 0)**

**EM 562—ADVANCED HYDROLOGY—2 cr. (2 and 0)**

**EM 564—GROUND-WATER HYDROLOGY—3 cr. (3 and 0)**

**EM 570—FLOOD CONTROL—3 cr. (3 and 0)**

**EM 572—HYDRAULIC PROJECTS—3 cr. (3 and 0)**

**EM 591—RESEARCH—3 cr.**

**EM 592—RESEARCH—3 cr.**
ENGLISH

Mr. Cox

Mr. C. B. Green, Mr. J. C. Green, Mr. Owings, Mr. Caskey,
Mr. Felder, Miss Holman, Mr. Holt, Mr. McGee, Mr. Watson,
Mr. Wilson, Mr. Winter, Mr. Calhoun, Mr. Day, Mr. Gum,
Mr. Steadman, Mrs. Arrington, Mr. Bloom, Mr. Bryant,
Mr. Dees, Miss Dunkel, Mr. Edwards, Mr. Griffin,
Mr. Hall, Miss Haynes, Mr. Henry, Mrs. Laws,
Mr. Peake, Mrs. Rice, Mr. Simms, Mr. South,
Mr. Tucker, Mr. Whitman, Mr. Willey

ENGL 101—ENGLISH COMPOSITION—3 cr. (3 and 0)
Training in correct and effective expression.

ENGL 102—ENGLISH COMPOSITION—3 cr. (3 and 0)
Continued emphasis on correct and effective expression; training in the organization and writing of various types of expository and semi-technical papers, including the research report. Prerequisite: Engl 101.

ENGL 181—ENGLISH COMPOSITION—3 cr. (3 and 0)
Honors section in Engl 101.

ENGL 182—ENGLISH COMPOSITION—3 cr. (3 and 0)
Honors section in Engl 102.

ENGL 203—A SURVEY OF ENGLISH LITERATURE—3 cr. (3 and 0)
Chief British authors and works from Beowulf through the Romantic period; continued emphasis on composition. Prerequisite: Engl 102.

ENGL 204—A SURVEY OF ENGLISH AND AMERICAN LITERATURE—3 cr. (3 and 0)
Chief British authors and works from the Victorian period to the present time, and selected readings from American literature. Proficiency in composition must be demonstrated. Prerequisite: Engl 203.

ENGL 283—SURVEY OF ENGLISH LITERATURE—3 cr. (3 and 0)
Same as Engl 203 except that this honors section is open to students only by invitation.

ENGL 284—SURVEY OF ENGLISH AND AMERICAN LITERATURE—3 cr. (3 and 0)
Same as Engl 204 except that this honors section is open to students only by invitation.

ENGL 300—JOURNALISM—1 cr. (1 and 0)
Responsibilities and duties of students editing uncensored publications; criticism of student publications; visiting speakers; review of English fundamentals. Open to members of publication staffs and to others by permission of instructor. Fall term only; offered only if requested by twenty students. Prerequisite: Engl 102.

ENGL 301—PUBLIC SPEAKING—3 cr. (3 and 0)
Practical training in public speaking; attention to diction, voice, and platform presence; an introduction to parliamentary procedure; practice in writing and delivering short speeches. Prerequisite: Engl 203 and 204.

* On leave.
Engl 302—Creative Writing—1 cr. (1 and 0)
The craft of writing, with emphasis upon the short story, the essay, and the poem. Intended primarily for contributors and staff of the Chronicle and similar publications; open to others by special arrangement. Prerequisite: Permission of the instructor.

Engl 304—Advanced Composition—3 cr. (3 and 0)
Supervised writing for students of advanced standing; a laboratory, following basic types of writing, with each student undertaking projects according to his interest; some attention to reports, business letters, research methods and materials. Weekly papers and some longer exercises. Limited enrollment. Prerequisite: Engl 203 and 204.

Engl 351—Children's Literature—3 cr. (3 and 0)
Wide reading in prose and verse suitable for children (Summer Sessions only.)

Engl 402—The English Language—3 cr. (3 and 0)
Studies in English usage and the historical development of the language. Prerequisite: Engl 203 and 204.

Engl 405—Shakespeare—3 cr. (3 and 0)
A selective study of Shakespeare's plays with attention to his development as a dramatist. Prerequisite: Engl 203 and 204.

Engl 406—Shakespeare—3 cr. (3 and 0)
A continuation of Engl 405. Prerequisite: Engl 203 and 204.

Engl 409—Chaucer—3 cr. (3 and 0)
Chaucer as an artist; the "Prologue" for historical and linguistic orientation; "The Canterbury Tales," "House of Fame," "Parliament of Fowls," and "Troilus and Criseyde" as art forms. Prerequisite: Engl 203 and 204.

Engl 415—Introduction to Drama—3 cr. (3 and 0)
Principles and progress of drama from Aeschylus to Ibsen, analysis of representative plays; critical reports; classroom reading of great scenes. Prerequisite: Engl 203 and 204.

Engl 416—Introduction to Drama—3 cr. (3 and 0)
Principles and progress of drama from Ibsen to the present; analysis of representative plays; critical reports; classroom reading of great scenes; discussion of important aspects of modern drama. Prerequisite: Engl 203 and 204.

Engl 423—A Survey of American Literature—3 cr. (3 and 0)
The colonial period to the Civil War, with emphasis on major authors. Prerequisite: Engl 203 and 204.

Engl 424—A Survey of American Literature—3 cr. (3 and 0)
From the Civil War to the present, with emphasis upon major authors. Prerequisite: Engl 203 and 204.

Engl 425—The Romantics—3 cr. (3 and 0)
The eighteenth-century forerunners of Romanticism; Wordsworth, Coleridge, Byron, Shelley, Keats; the essayists. Prerequisite: Engl 203 and 204.
Description of Courses

**Enl 427—Victorian Literature—3 cr. (3 and 0)**
Representative works from the prose and poetry of Victorian writers; consideration of English intellectual, social, and political life of the period. **Prerequisite:** Enl 203 and 204.

**Enl 431—The Restoration and Eighteenth Century—3 cr. (3 and 0)**
Readings in Dryden, Swift, Pope, and Dr. Johnson. **Prerequisite:** Enl 203 and 204.

**Enl 435—Southern Literature—3 cr. (3 and 0)**
The intellectual and literary achievement of the South from 1607 to the present, with emphasis upon the writers of the nineteenth century. **Prerequisite:** Enl 203 and 204.

**Enl 436—Milton and His Age—3 cr. (3 and 0)**
The development of Milton's thought and art in relation to his times and to the writings of his contemporaries. **Prerequisite:** Enl 203 and 204.

**Enl 437—The English Novel—3 cr. (3 and 0)**
A critical and historical study of major English novelists from Defoe to Hardy. **Prerequisite:** Enl 203 and 204.

**Enl 438—Contemporary Poetry—3 cr. (3 and 0)**
The modern tradition in English and American poetry from Yeats to the present; relevant critical essays. **Prerequisite:** Enl 203 and 204.

**Enl 439—Contemporary Fiction—3 cr. (3 and 0)**
Major novelists and short story writers from Dostoevsky to Kerouac, with stress upon British and American writers. **Prerequisite:** Enl 203 and 204.

**Enl 440—Literary Criticism—3 cr. (3 and 0)**
Major critical approaches to literature, in theory and practice, from Aristotle to the present. **Prerequisite:** Enl 203 and 204.

**Enl 441—A Survey of World Literature I—3 cr. (3 and 0)**
Translations from the Hellenic, Hebraic and Oriental worlds, with emphasis on major authors. **Prerequisite:** Enl 203 and 204.

**Enl 442—A Survey of World Literature II—3 cr. (3 and 0)**
Translations from the Medieval, Renaissance and Modern worlds, with emphasis on major authors. **Prerequisite:** Enl 203 and 204.

**Enl 503—Seminar in American Literature I—3 cr. (3 and 0)**

**Enl 504—Seminar in American Literature II—3 cr. (3 and 0)**

**Enl 505—Seminar in English Literature I—3 cr. (3 and 0)**

**Enl 506—Seminar in English Literature II—3 cr. (3 and 0)**
ENTOMOLOGY

Mr. Cochran

Mr. Reed, Mr. King, Mr. Adkins, Mr. Buxton, Mr. Fox,
Mr. Tombes, Mr. Purser

ENT 301—Elementary and Economic Entomology—3 cr. (2 and 3)
A general introduction to Entomology with emphasis on anatomy, meta-
morphosis, life-histories of our most important species and methods of control. 
Prerequisite: Zool 101 and 103.

ENT 305—Economic Entomology—3 cr. (2 and 3)
Identification and life-histories of injurious insects; their damage, and control 
measures. Common pests of the following are studied: cotton, corn, small 
grains, legume field crops, tobacco, sugar cane, stored grain and seed, livestock 
and man. Prerequisite: Zool 101, 103 and Ent 301.

ENT 306—Economic Entomology—3 cr. (2 and 3)
Insecticide and other control measures for insects. This is followed by 
detailed study of habits, life-histories and approved control measures for insect 
pests of all fruit and vegetable crops. Prerequisite: Zool 101, 103 and Ent 301.

ENT 307—Forest Entomology—3 cr. (2 and 3)
Insects of economic importance to forests, forest products and shade trees, 
and their role in the practice of good forest management as well as their 
significance in the natural environment.

ENT 308—Apiculture—3 cr. (2 and 3)
A detailed study of the honey bee and its economic importance in pollina-
tation and honey production. Attention will be given to bee behavior, colony 
management, equipment, honey plant identification, and honey production and 
processing. Prerequisite: Zool 101, 103 and permission of the instructor.

ENT 405—Insect Morphology—4 cr. (3 and 3)
A study of insect structure in relation to function and of the variation of 
form in insects. Prerequisite: Ent 301.

ENT 408—General and Taxonomic Entomology—5 cr. (3 and 6)
Lecture material includes a review of the bionomics of the principal families 
of insects. Laboratory work consists of practice in the identification of adults 
of the principal families in the major orders. Prerequisite: Zool 101, 103, Ent 
301; Ent 405 desirable.

ENT 455—Medical and Veterinary Entomology—3 cr. (2 and 3)
Insects and their arthropod relatives which are of considerable economic 
importance in their effect on man and animals.

ENT 461—Seminar—1 cr. (1 and 0)
Students review the principal journals pertaining to insects and related 
animals; also review the lives and activities of prominent pioneer entomologists. 
Prerequisite: Zool 101, 103; Ent 301.

ENT 462—Seminar—1 cr. (1 and 0)
Students review the principal journals pertaining to insects and related 
animals; also review the lives and activities of prominent pioneer entomologists. 
Prerequisite: Zool 101, 103 and Ent 301.
ENT 468—Introduction to Research—2 cr. (1 and 3)
Principles, developments and changes in research methods related to certain fields of agricultural research. The students obtain practice in experimental techniques, scientific writing and the use and maintenance of various research instruments and equipment.

ENT 508—Taxonomy of Immature Insects—3 cr. (1 and 6)
ENT 556—Medical Entomology—3 cr. (2 and 3)
ENT 560—Principles of Insect Control—3 cr. (3 and 0)
ENT 561—Insect Toxicology—3 cr. (2 and 3)
ENT 562—Insect Physiology—3 cr. (2 and 3)
ENT 563—Special Problems in Entomology—3 to 6 cr.
ENT 590—Research Techniques in Agriculture—3 cr. (2 and 3)
ENT 591—Research—3 cr.
ENT 592—Research—3 cr.

EXPERIMENTAL STATISTICS
Mr. Byrd Mr. Todd

Ex St 401—Introductory Statistics—3 cr. (2 and 3)
An elementary course dealing with basic statistical concepts and methods, organization and presentation of data, measures of central tendency and variation, problems of sampling, simple regression and correlation and introduction to inductive statistics.

Ex St 462—Statistics Applied to Economics—3 cr. (3 and 0)
Statistical methods used in the collection, analysis, presentation and interpretation of economic data. Special attention is given to time series analysis, the construction of index numbers and the designing of samples for surveys in the social science fields. Prerequisite: Ex St 401.

Ex St 501—Statistical Methods I—4 cr. (3 and 3)
Ex St 502—Statistical Methods II—3 cr. (3 and 0)
Ex St 512—Experimental Design—3 cr. (3 and 0)

FOOD TECHNOLOGY
Mr. Mitchell
Mr. Shewfelt, Mr. Borgman, Mr. Wheeler

FdT 301—Raw Food Materials for Processing—4 cr. (3 and 3)
This course includes lectures, reference reading, and laboratory work on the fruits, vegetables, cereal grains, oil seeds, and sugar crops important to the food processing industry. Commercial growing areas, maturity characteristics, effects of harvesting and handling on quality, storage of raw materials, quality grading, and government standards are covered. Prerequisite: Bot 101.

FdT 302—Elements of Food Technology—3 cr. (3 and 0)
Lectures and reference reading cover the principles of food preservation by freezing, dehydration, canning, concentration, brining, smoking, sugar and
chemical additives. Prerequisite: Ch 220 or 323 and 327 and Phys 201 and 203 or 211 and 213.

FdT 401—ELEMENTS OF FOOD TECHNOLOGY—3 cr. (3 and 0)
Lectures and reference reading cover the principles of processing cereal grain products, sugars, syrups, vegetable oils, dairy products, meats, fish, confectionary, fruits and vegetable juices, tea, coffee, nuts, spices, and flavors. Principles of packaging are discussed. Prerequisite: FdT 302.

FdT 403—FOOD PROCESSING—3 cr. (1 and 6)
Lectures are concerned with a review of the fundamentals and technology of canning, freezing, dehydration, and types of pack. The essentials of factory quality control are discussed. Laboratory work introduces the student to processing equipment. Canning, freezing, dehydration, and fermentation operations relating to fruits and vegetables are conducted. Subjective and objective quality tests are made, and quality grading is conducted by government standards. Prerequisite: FdT 301 and 302, Bact 301, and Ch. 316.

FdT 404—FOOD PROCESSING—3 cr. (1 and 6)
Lectures are concerned with the fundamentals and technology of canning and freezing of formulated products, meats, and poultry, the processing of eggs, vegetable oils, and cereal grains, and the manufacture of mayonnaise and salad dressings. Laboratory work is concerned with processing of meat, poultry, vegetable oils, and formulated products (baking mixes, pie mixes, and others), and manufacture of mayonnaise and salad dressings. Prerequisite: FdT 401 and 403.

FdT 405—FOOD ANALYSIS—1 cr. (0 and 3)
Laboratory work emphasizes chemical and physical methods important in food quality control. Included are methods for color, texture, flavor, and composition. Prerequisite: Ch 316.

FdT 406—BIOCHEMISTRY OF NUTRITION—3 cr. (2 and 3)
Human nutrition is discussed in relation to man's needs for specific nutrients. Research methodology in nutrition investigations is explained. Laboratory includes work with small animals and assays for nutrients by chemical and microbiological methods. Prerequisite: Ch 316 and Ch 220 or 323 and 327.

FORESTRY

Mr. Lehotsky

Mr. Bruner, Mr. Cool, Mr. McGregor, Mr. Randel, Mr. Shipman, Mr. Warner, Mr. Lane, Mr. Shain

For 201—INTRODUCTION TO FORESTRY—1 cr. (1 and 0)
An informative sketch of forestry, forests, and forestry tasks of the nation; education in career opportunities of foresters. Prerequisite: Bot 101.

For 202—DENDROLOGY—4 cr. (3 and 3)
Identification and nomenclature of the principal forest trees of the United States; their geographical distribution and economic importance; identification of many forest shrubs and commonly planted exotics. Prerequisite: Bot 101.

For 203—SILVICS—2 cr. (2 and 0)
Growth factors influencing the establishment and development of forest trees and stands. Prerequisite: Bot 101, Chem 102.
For 251S—Silvics—2 cr. (Summer Camp)
Field studies of growth factors influencing the establishment and development of forest stands. Prerequisite: Agron 202, Bot 356, CE 200, For 202, For 203.

For 252S—Forest Engineering—2 cr. (Summer Camp)
Field surveying, establishment of boundary lines, planning and construction of forest trails and roads. Prerequisite: CE 200, EG 105.

For 253S—Dendrometry—4 cr. (Summer Camp)
Elements of mensuration dealing with volume determination of standing and harvested trees as well as forest stands. Prerequisite: CE 200, EG 105, For 202.

For 254S—Forest Products—1 cr. (Summer Camp)
Field studies of logging methods and equipment; trips to selected wood-using industries. Prerequisite: CE 200, For 202.

For 301—Aerial Forest Mapping—3 cr. (2 and 3)
Use of aerial photographs in forestry; elementary photographic measurements; aerial photo interpretations; mapping and timber estimating procedures. Prerequisite: CE 203 and Forestry Summer Camp.

For 302—Dendrometry—3 cr. (2 and 3)
Volume determination of trees, logs, and stands; statistical procedures applied to forest measurements. Prerequisite: Ex St 401 and Forestry Summer Camp.

For 303—Silviculture—4 cr. (3 and 3)
Maintenance, harvesting, natural and artificial regeneration of forest stands based on the interrelation of biotic characteristics of stands and their environment. Prerequisite: For 203 and Forestry Summer Camp.

For 304—Forest Economics—3 cr. (3 and 0)
Economic problems and principles involved in the utilization of forest land and timber and in the distribution of forest products; cost analysis of integrated forest operations. Prerequisite: Econ 201.

For 306—Wood Technology—1 cr. (0 and 3)
Macroscopic and microscopic identification, properties, and uses of selected economically significant timbers. Prerequisite: Bot 101, Chem 102.

For 307—Farm Forestry—3 cr. (2 and 3)
A compendium of forestry subjects forming a foundation for the management and utilization of farm forests and especially those of South Carolina. Prerequisite: Bot 101.

For 402—Logging and Milling—4 cr. (2 and 6)
Logging and milling methods and costs, their administration; analysis of logging and milling operations; seasoning, grading, and marketing of lumber. Prerequisite: Senior standing.

For 403—Forest Products—3 cr. (2 and 3)
Primary forest products other than sawlogs, e.g., poles, pulpwood, veneer stock, excelsior; secondary forest products, e.g., naval stores, maple syrup, Christmas trees; utilization and marketing of forest products. Prerequisite: Phys 202 and Senior standing.
For 404—Management Plans—1 cr. (0 and 3)
Analysis and assembling of factors entering into a forest working plan; drawing of maps corollary to forest regulation; preparation of management plans. Prerequisite: For 407.

For 405—Forest Protection—2 cr. (2 and 0)
Causative and control factors of forest fires; fire prevention and suppression. Protection of forest resources against damages caused by man and animals. Prerequisite: Senior standing.

For 406—Forest Policy and Administration—2 cr. (2 and 0)
Development of public and private forest policy in the United States; administrative and executive tasks in forestry; principles of organization, personnel management, and budget. Prerequisite: Senior standing.

For 407—Forest Regulation—4 cr. (3 and 3)
Correlation of production factors and yields of forests; normal and empirical forests; rotations and cutting cycles; regulation of cuts and growing stock in sustained yield management. Prerequisite: For 302, 303.

For 408—Forest Valuation—3 cr. (3 and 0)
Capital investments in forestry and the returns derivable from them; valuation of land, timber, and other resources associated with forestry; appraisal of damage and stumpage values. Prerequisite: For 304, 407.

French

Mr. Dean, Mr. Stern, Mr. Kindermann, Mr. Mixon

Fr 101—Elementary French—3 cr. (3 and 0)
A course for beginners in which, through conversation, composition and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language.

Fr 102—Elementary French—3 cr. (3 and 0)
A continuation of Fr 101, in which a reader is also used.

Fr 201—Intermediate French—3 cr. (3 and 0)
A short review of grammar, with conversation, composition and dictation continued from Fr 102, and the beginning of more serious reading of French prose in short stories or novels.

Fr 202—Intermediate French—3 cr. (3 and 0)
While attention is paid to writing and speaking French, more stress is laid on the rapid reading of more difficult French prose than in the earlier courses.

Fr 303—Survey of French Literature I—3 cr. (3 and 0)
Literary movements and authors from the beginnings to the eighteenth century. Required of French majors. Prerequisite: Fr 201 and 202.

Fr 304—Survey of French Literature II—3 cr. (3 and 0)
Literary movements and authors of the nineteenth and twentieth centuries. Required of French majors. Prerequisite: Fr 201 and 202.

Fr 305—Conversational French—3 cr. (3 and 0)
Practice in the spoken language, with stress on vocabulary building, pronunciation, intonation, and comprehension; written work to increase accuracy.
Assignments in the language laboratory. Required of French majors. **Pre-requisite:** Fr 201 and 202.

**Fr 306—Advanced Conversation and Composition—3 cr. (3 and 0)**
A continuation of Fr 305, with additional emphasis on written composition. Required of French majors. **Prerequisite:** Fr 305.

**Fr 403—Twentieth Century Prose—3 cr. (3 and 0)**
The outstanding authors of the first half of the twentieth century: Proust, Gide, Mauriac, Saint-Exupéry, Sartre, Camus, and others. Reading of selected works, discussions, and reports. **Prerequisite:** Fr 303 and 304.

**Fr 404—Twentieth Century Drama—3 cr. (3 and 0)**
The French theater since 1900, with emphasis on the period after 1930. Readings, discussions, and reports. **Prerequisite:** Fr 303 and 304.

**Fr 405—Nineteenth Century French Romanticism—3 cr. (3 and 0)**
The romantic movement as expressed in the works of Chateaubriand, Hugo, Merimée, Vigny, Stendahl, Sand, and others. Readings, discussions, and reports. **Prerequisite:** Fr 303 and 304.

**Fr 406—Nineteenth Century French Realism—3 cr. (3 and 0)**
Realism as expressed in the works of Balzac, Flaubert, Daudet, Maupassant, Zola, and others. Selected works, discussions, and reports. **Prerequisite:** Fr 303 and 304.

**Fr 407—Eighteenth Century French Literature—3 cr. (3 and 0)**
The principal literary figures of the eighteenth century, with particular emphasis on Voltaire and Rousseau. Selected works, discussions, and reports. **Prerequisite:** Fr 303 and 304.

**Fr 408—Seventeenth Century French Drama—3 cr. (3 and 0)**
The French classical drama, with emphasis on Corneille, Racine, and Molière. Selected works, discussions, and reports. **Prerequisite:** Fr 303 and 304.

**GEOGRAPHY**

**Mrs. Bardsley**

**Geog 301—Economic Geography—3 cr. (3 and 0)**
The geographic conditions fundamental to the world’s resources—agricultural, mineral, commercial and industrial, and the conditions which affect their production, exchange, consumption and strategic significance. **Prerequisite:** Junior standing.

**Geog 302—Political Geography—3 cr. (3 and 0)**
The geographical pattern of the major nations, empires, dominions, commonwealths and other dependencies, their boundaries, resources and strategic connections. The current principles of geopolitics, with their application to the United States, Europe and Asia will be examined. **Prerequisite:** Junior standing.

**GEOLOGY AND MINERALOGY**

**Mr. Brown, Mr. Tingle, Mr. Cazeau**

**Geol 201—Physical Geology—3 cr. (3 and 0)**
A study of the minerals and rock which compose the earth’s crust, their origins and transformations. Emphasis is placed upon geological processes,
both internal and external, by which changes are produced on or in the earth. *Prerequisite:* Registration in Geol 203.

**Geol 203—Physical Geology Laboratory—1 cr. (0 and 3)**
Common minerals and rocks are studied. Instruction is also provided in the interpretation of geologic processes through study of topographic maps. Field trips provide direct observation of processes and results. *Prerequisite:* Geol 201 or registration in Geol 201.

**Geol 304—Historical Geology—3 cr. (3 and 0)**
Evolution, both organic and inorganic, is traced from the beginning of the record up through the ages to the present. *Prerequisite:* Geol 201 and registration in Geol 305.

**Geol 305—Historical Geology Laboratory—1 cr. (0 and 3)**
The student learns to recognize plants and animals which have left their record as fossils in the rocks of the earth's crust. Emphasis is placed upon geologic structures and the interpretation of geologic maps. Field trips are planned to demonstrate classroom concepts. *Prerequisite:* Credit in Geol 304 or simultaneous registration in Geol 305.

**Geol 306—Mineralogy—3 cr. (2 and 3)**
In this course the student gains a working knowledge of crystallography and a comprehensive knowledge of determinative mineralogy. Identification of the minerals is based on their physical and chemical properties. *Prerequisite:* Geol 201 or 406.

**Geol 307—Optical Mineralogy—3 cr. (2 and 3)**
The purpose of this course is to enable the student to identify minerals under the microscope on the basis of their optical properties. *Prerequisite:* Geol 306.

**Geol 309—Petrology—3 cr. (2 and 3)**
A study of the genesis, evolution, and classification of rocks through lectures, laboratory exercises, and field trips. The occurrences, chemical relationships, and distribution of rock types are emphasized. *Prerequisite:* Geol 306.

**Geol 311—Stratigraphy and Sedimentation—3 cr. (3 and 0)**
A study of the processes by which sediments are eroded, transported, and deposited (sedimentation), with major emphasis on relationships of the areal and time distribution of stratified rocks and their historical significances (stratigraphy). *Prerequisite:* Geol 201 and 304 or 406.

**Geol 402—Structural Geology—3 cr. (3 and 0)**
A study of the diverse geological structures of the earth, their description, origin, and field recognition. Practical problems in interpreting geologic structures are utilized, in addition to theoretical considerations of the mechanics and causes of tectonism. *Prerequisite:* Geol 201 and 304 or 406.

**Geol 404—Economic Geology—2 cr. (2 and 0)**
This course concerns the description and classification of ore deposits and commercial non-metallic mineral deposits. The origin of mineral deposits and their occurrence is emphasized. Problem studies and field trips to nearby mines and quarries. *Prerequisite:* Geol 306.

**Geol 406—Engineering Geology—3 cr. (2 and 3)**
This course is similar to Geol 201 except that progress is faster and emphasis is on the relationship of geology to engineering.
GEOL 411—Research Problems—3 cr. (0 and 9)
A field, laboratory, or library study of an approved topic in geology. The topic would be one not normally covered in formal course offering, but may be an extension of a course. Prerequisite: Senior standing in geology or approval of the Department Head.

GEOL 412—Research Problems—3 cr. (0 and 9)
A continuation of Geol 411.

GEOL 500—Earth Science I—3 cr. (2 and 3)

GEOL 550—Earth Science II—3 cr. (2 and 3)

GERMAN

Mr. Dean, Mr. Drake, Mr. Laws

GER 101—Elementary German—3 cr. (3 and 0)
A course for beginners in which, through conversation, composition and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language.

GER 102—Elementary German—3 cr. (3 and 0)
A continuation of Ger 101, in which a reader is also used.

GER 201—Intermediate German—3 cr. (3 and 0)
A short review of grammar, with conversation, composition and dictation continued from Ger 102, and the beginning of more serious reading of German prose in short stories or novels.

GER 202—Intermediate German—3 cr. (3 and 0)
While attention is paid to writing and speaking German, more stress is laid on the rapid reading of more difficult German prose than in the earlier courses.

GER 251—Scientific German—3 cr. (3 and 0)
An alternate course to Ger 201, designed primarily to prepare graduate students for readings in general science with a thorough review of grammar and syntax. Prerequisite: Ger 101 and 102 and permission of the instructor.

GER 303—Survey of German Literature I—3 cr. (3 and 0)
Literary movements and authors from the beginnings through romanticism, with emphasis upon Goethe and his contemporaries. Required of German majors. Prerequisite: Ger 201 and 202.

GER 304—Survey of German Literature II—3 cr. (3 and 0)
Literary movements and authors from the end of romanticism to the present. Required of German majors. Prerequisite: Ger 201 and 202.

GER 305—Conversational German—3 cr. (3 and 0)
Practice in the spoken language, with emphasis on vocabulary, pronunciation, and comprehension; written exercises for accuracy; assignments in the language laboratory. Prerequisite: Ger 102.

GER 306—Advanced Conversation and Composition—3 cr. (3 and 0)
Continuation of Ger 305 with additional emphasis on written composition. Required of German majors. Prerequisite: Ger 305.
Ger 403—Nineteenth Century German Literature—3 cr. (3 and 0)
Selected works of Heine, Hebbel, Grillparzer, Keller, Meyer, Hauptmann, Schnitzler, and Hofmannsthal. Readings, discussions, and reports. Prerequisite: Ger 303 and 304.

Ger 404—20th Century German Literature—3 cr. (3 and 0)
Selected works from authors of the twentieth century. Prerequisite: Ger 303 and 304.

GOVERNMENT

Mr. Tuttle, Miss Brown, Mr. Owens

Gov 101—American National Government—3 cr. (3 and 0)
The principles, structure and functions of the national government of the United States. Not open to juniors and seniors.

Gov 301—American Government and Political Parties—3 cr. (3 and 0)
The constitution: powers and functions of executive, legislative and judicial branches; citizenship; expansion of governmental activities. A study of the nature, development, organization and methods of political parties, and the conduct of elections. Not open to those who have completed Gov 101.

Gov 302—State and Local Government—3 cr. (3 and 0)
The American state and local government structural features and functions, and their legislative, administrative and judicial processes.

Gov 303—Constitutional Development in the United States—3 cr. (3 and 0)
The origin and growth of the Constitution of the United States.

Gov 401—Comparative Government—3 cr. (3 and 0)
Political institutions of Great Britain, Russia, France, Italy, Germany, Canada and Argentina. Prerequisite: Junior standing.

Gov 403—International Relations—3 cr. (3 and 0)
To acquaint the student with current world movements and conditions, so that he may be able to think intelligently on the problems confronting our nation. Prerequisite: Senior standing.

HISTORY

Mr. Epting

Mr. Bolen, Mr. Lambert, Mr. Lander, Mr. Landrith, Mrs. Ringold, Mr. Tuttle, Mr. Amundson, Mrs. Bardsley, Mr. Black, Mrs. R. S. Davis, Mrs. Hill, Mr. J. W. Davis* Mrs. Owens

Hist 101—American History—3 cr. (3 and 0)
The political, economic and social development of the American people from the period of discovery to the end of the Civil War.

Hist 102—American History—3 cr. (3 and 0)
The political, economic and social development of the American people from the end of the Civil War to the present.

* On leave.


Hist 104—Western Civilization—3 cr. (3 and 0)
A survey of the history of the modern world and the forces which have shaped its political, economic, and social institutions.

Hist 181—American History—3 cr. (3 and 0)
Same as Hist 101 except that this honors section is open to students only by invitation.

Hist 182—American History—3 cr. (3 and 0)
Continuation of Hist 181.

Hist 184—Western Civilization—3 cr. (3 and 0)
Same as Hist 104 except that this honors section is open to students only by invitation.

Hist 203—History of Civilization—3 cr. (3 and 0)
The political, economic and social movements of Western Civilization from ancient times to 1660. Prerequisite: Junior standing or permission of instructor.

Hist 204—History of Civilization—3 cr. (3 and 0)
The political, economic and social movements of Western Civilization from 1660 to the present. Prerequisite: Junior standing or permission of instructor.

Hist 301—History of the United States Since 1865—3 cr. (3 and 0)
An advanced study of the political, social, and economic development of the United States since the end of the Civil War. Prerequisite: Junior standing. Not open to students who have completed Hist 102.

Hist 309—History of England—3 cr. (3 and 0)
England and her people. Prerequisite: Junior standing.

Hist 310—Ancient Civilization—3 cr. (3 and 0)
From beginning of civilization to A.D. 476.

Hist 312—History of Russia—3 cr. (3 and 0)
A survey of the history of Russia from the earliest times to the present.

Hist 401—History of South Carolina—3 cr. (3 and 0)
The political, economic and social development of South Carolina from 1670 up to the present. Prerequisite: Junior standing.

Hist 402—Medieval History—3 cr. (3 and 0)
A survey of the period from the eclipse of Rome to the advent of the Renaissance; emphasizing human migrations, feudalism, rise of towns, and the cultural life. Prerequisite: Hist 201 and 202.

Hist 403—History of the South—3 cr. (3 and 0)
Origins and development of political, economic, and cultural institutions of the South from the Colonial period to the present; and the role of the South in the nation’s development.

Hist 406—American Economic Development—3 cr. (3 and 0)
The history of the economic development of the United States from 1492 to the present with emphasis on agriculture, transportation, banking, commerce, economic policies of the national government, and particularly the industrial revolution.

Hist 408—International Relations Since 1914—3 cr. (3 and 0)
The great powers and world politics since 1914.
HIST 410—HISTORY OF COLONIAL AMERICA—3 cr. (3 and 0)
The development of American institutions and customs in the period before 1776. Considerable emphasis is placed on the imperial relations between Great Britain and her colonies and upon the movement towards, and the philosophy of, the American revolution.

HIST 411—UNITED STATES, 1783-1850—3 cr. (3 and 0)
The formation and growing pains of the new nation through the Federal and Middle periods of its history, with emphasis on economic and political development, the westward movement, and the conflicting forces of nationalism and sectionalism.

HIST 412—UNITED STATES, 1850-1900—3 cr. (3 and 0)
A course dealing with the background causes of, developments during, and broad problems after, the Civil War in American history.

HIST 413—UNITED STATES HISTORY SINCE 1900—3 cr. (3 and 0)
The history of the United States from 1900 to the present.

HIST 501—SEMINAR IN SOUTH CAROLINA HISTORY—3 cr. (3 and 0)

HIST 502—SEMINAR IN UNITED STATES ECONOMIC HISTORY—3 cr. (3 and 0)

HORTICULTURE

Mr. Senn

Mr. Van Blaricom, Mr. Ogle, Mr. Sefick, Mr. Thode, Mr. Fulmer, Mr. Sims, Mr. Stembridge, Mr. Skelton

HORT 201—GENERAL HORTICULTURE—3 cr. (2 and 3)
A working knowledge of the fundamental plant processes is developed, showing the influence of light, temperature, water and nutrients upon vegetative growth and reproduction of horticultural plants. Production practices, harvesting, storage and marketing of the principal fruit, vegetable and ornamental crops are discussed with demonstrations and practice in greenhouse and orchard. Prerequisite: Bot 101 and Ch 101.

HORT 302—PRINCIPLES OF VEGETABLE PRODUCTION—3 cr. (2 and 3)
The general principles of vegetable growing and handling. Phases receiving special emphasis are: economic importance, producing areas, management practices, plant forcing, cultural practices, irrigation, quality factors, harvesting, grading, packing, storage, market inspection, transportation, refrigeration, exhibition and seed production. Prerequisite: Hort 201.

HORT 303—PLANT MATERIALS I—3 cr. (2 and 3)
A study of woody, ornamental plants and their aesthetic and functional uses in landscape developments. The study covers habit of growth, ultimate size, texture effect, period of bloom, color, and cultural requirements.

HORT 304—PLANT MATERIALS II—3 cr. (2 and 3)
A study of herbaceous, ornamental plants which are commonly used as garden flowers. This study covers habit of growth, size, period of bloom, color, and cultural requirements.

* On leave.
Hort 305—Plant Propagation—3 cr. (2 and 3)
Methods of propagation; time, manner and material for making cuttings; temperature and media for rooting cuttings or ornamental trees, shrubs and flowering plants; propagating structures, soils and fertilizers. Practical instruction given in field and greenhouse. Prerequisite: Hort 201.

Hort 308—Landscape Design—3 cr. (2 and 3)
Landscape planning of residential and public properties in order to achieve best use and most enjoyment from a given piece of ground. Prerequisite: Hort 303.

Hort 310—Floriculture—3 cr. (2 and 3)
Greenhouse production of commercial flower crops; soils; fertilizers; greenhouse diseases and insects; flower crops to be grown on benches and as pot plants; marketing and costs of production. Prerequisite: Hort 201.

Hort 352—Commercial Pomology—3 cr. (2 and 3)
Fruit bud formation, rest period and water relations of fruit plants, soils, fruit setting; orchard soil management and responses of various fruits to fertilizers; principles of pruning, effect of climatic differences, freezing of tissues and means of avoiding injury; harvesting, transportation and storage.

Hort 405—Nut Tree Culture—2 cr. (2 and 0)
The production, harvesting and marketing of the principal nut crops with emphasis on the pecan. Prerequisite: Hort 201.

Hort 406—Nursery Technology—3 cr. (2 and 3)
Principles and techniques in handling nursery crops. Prerequisite: Hort 303 and Hort 305.

Hort 407—Landscape Design—3 cr. (2 and 3)
The first half of this course is a study of trees, shrubs, vines and ground covers used in landscape planting. Attention is given to cultural requirements, growth habits, period of bloom, texture and fall color. The second half of the course is devoted to landscape planning for small residential properties.

Hort 409—Seminar—1 cr. (1 and 0)
Recent research work on various phases of horticulture, methods of conducting investigations, and preparation of report of investigations.

Hort 410—Seminar—1 cr. (1 and 0)
A continuation of Hort 409.

Hort 412—Turf Management—3 cr. (2 and 3)
The identification, use, culture, and maintenance of turf grasses.

Hort 451—Small Fruit Culture—3 cr. (2 and 3)
Varieties, soils, sites, culture, fertilizers, harvesting and preparation for marketing of grapes, strawberries, dewberries, blackberries, raspberries and other small fruits. Prerequisite: Hort 201.

Hort 456—Truck Crops—3 cr. (2 and 3)
A detailed study of the principles and practices employed in the commercial growing and marketing of vegetable crops. Emphasis is placed on temperature requirements, plant characteristics, varieties, soils, fertilizers, weed control, harvesting and preparation for market.
Hort 460—Advanced Landscape Design—5 cr. (3 and 6)
Landscape planning for larger residential properties, schools, industrial plants, real estate developments; detailed finished plans, costs; further study of materials used; original problems; field study. Prerequisite: Hort 308 or 407.

Hort 464—Food Preservation—3 cr. (2 and 3)
Theoretical background and fundamental processes of food preservation. Techniques used for community canning, commercial canning, frozen food preservation, juice manufacturing, jam and jelly making.

Hort 468—Introduction to Research—2 cr. (1 and 3)
Principles, developments and changes in research methods related to certain fields of agricultural research. The students obtain practice in experimental techniques, scientific writing and the use and maintenance of various research instruments and equipment. Prerequisite: Senior standing.

Hort 501—Problems in Small Fruit Production—3 cr. (3 and 0)
Hort 502—Advances in Horticulture—3 cr. (2 and 3)
Hort 503—Experimental Olericulture—3 cr. (3 and 0)
Hort 504—Scientific Advances in Ornamental Horticulture—3 cr. (3 and 0)
Hort 505—Quality Control for Horticulture Crops—3 cr. (2 and 3)
Hort 506—Post-Harvest Handling of Horticultural Crops—3 cr. (2 and 3)
Hort 507—Pomology—3 cr. (3 and 0)
Hort 508—Special Problems in Horticulture—2 cr. (2 and 0)
Hort 509—Seminar I—1 cr. (1 and 0)
Hort 510—Seminar II—1 cr. (1 and 0)
Hort 591—Research—3 cr.
Hort 592—Research—3 cr.

INDUSTRIAL EDUCATION
Mr. Laitala
Mr. J. L. Brock, Mr. D. C. Brock, Mr. Morgan, Mr. Newton

In Ed 201—Industrial Education Laboratory—2 cr. (1 and 3)
This course is the first of a series designed to provide the student with the opportunity to gain competency needed for the successful teaching of Industrial subjects. Emphasis is on basic understanding of terminology, materials, tools, machines, and processes used in industry. Prerequisite: Math 106.

In Ed 202—Industrial Education Laboratory—3 cr. (1 and 6)
A study of the properties of wood and woodworking practices. Prerequisite: In Ed 201.

In Ed 301—Industrial Education Laboratory—3 cr. (1 and 6)
IN Ed 302—DWELLING MATERIALS AND CONSTRUCTION METHODS—2 cr. (1 and 3)
A study of the commonly used building materials and the methods of combining them in present day construction. Prerequisite: In Ed 202.

IN Ed 303—INDUSTRIAL EDUCATION LABORATORY—3 cr. (1 and 6)
A study of material joining—welding, brazing, soldering, adhesives, etc.—and heat treatment practices. Prerequisite: In Ed 301.

IN Ed 304—EQUIPMENT MAINTENANCE—1 cr. (0 and 3)
A course in preventive maintenance and repair of tools, machines, and equipment in the school laboratory. Prerequisite: In Ed 301 and EE 303.

IN Ed 310—METHODS OF TRADE TEACHING—3 cr. (3 and 0)
This course is designed to give basic instruction to beginning teachers in trade work. The psychological factors of learning are discussed; individual differences; the different methods of teaching subjects; the special methods used in teaching skills; classroom management and organization; grading of students and keeping of proper records and reports. (Offered in Summer Sessions only.)

IN Ed 312—METAL PROCESSES IN THE GENERAL SHOP—3 cr. (3 and 0)
Major emphasis is placed on planning and development of projects in wrought iron, sheet metal, art metal, metal spinning, welding, heat treating and other aspects of metal work that fit into a general shop program. The course consists of shop practices as well as theoretical consideration of metal work. (Offered in Summer Sessions only.)

IN Ed 313—CERAMICS AND ALLIED PROCESSES IN THE GENERAL SHOP—3 cr. (3 and 0)
Materials and processes in the ceramic and allied industries are emphasized. A major part of the time is given to planning and development of projects involving extrusion, forming, molding and oven treatment of clays in making brick, tile, stoneware and pottery. Allied materials and processes, such as glass making, blowing, coloring, and leading and molding are given some attention. (Offered in Summer Sessions only.)

IN Ed 314—BASIC ELECTRICITY IN THE GENERAL SHOP—3 cr. (3 and 0)
The place of electricity in industry and the home is studied and discussed. Major emphasis is placed on planning and developing projects involving an understanding of electrical principles as applied in electric circuits, electric motors, radio, television, telephony, and automatic controls involving vacuum tubes and other electronic devices and materials. In addition, attention is given to maintenance and servicing of electrical appliances used in the home. (Offered in Summer Sessions only.)

IN Ed 315—CONSTRUCTION PRACTICES—3 cr. (3 and 0)
This course covers brick, tile, concrete, plastering, and other construction materials and methods. (Offered in Summer Sessions only.)

IN Ed 316—PLASTICS AND PLASTIC PROCESSES IN THE GENERAL SHOP—3 cr. (3 and 0)
The industrial, commercial and personal uses of plastics are discussed and demonstrated. In addition, the kinds of plastics, their properties, and special uses are studied. (Offered in Summer Sessions only.)
In Ed 317—Graphic Art Processes in the General Shop—3 cr.
(3 and 0)

The graphic art processes as means of expression and communication are thoroughly studied and discussed. Major emphasis is placed on projects involving composing, proofing, letter press work, bed press work, block printing, silk screen printing, offset printing and other processes in vogue at the present time. (Offered in Summer Sessions only.)

In Ed 318—Industrial Technology Techniques—3 cr. (3 and 0)

Methods and techniques of modern industrial production processes are investigated and studied. Students are required to set-up jigs and fixtures, develop and carry to completion projects involving production methods in modern industry. Major emphasis is placed on casting, stamping and forming processes, forging and extrusion processes, machining processes, metal spraying or metalurgy, blast cutting, heating and case hardening, assembly processes, bending, finishing processes, inspection gaging. (Offered in Summer Sessions only.)

In Ed 320—Machine Woodworking—2 cr. (1 and 3)

Study of basic characteristics of woodcutting, shaping, and finishing operations by use of machinery and auxiliary tools. Includes project work. Prerequisite: Junior standing. (Not for Industrial Education Students.)

In Ed 401—Industrial Education Laboratory—3 cr. (1 and 6)

A study of machining practices. Prerequisite: Math 200 and In Ed 303.

In Ed 402—Directed Teaching—6 cr. (1 and 15)

Supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for securing experience in teaching industrial subjects. Prerequisite: In Ed 405, 416, 425, and grade-point ratio of 1.80.

In Ed 405—Tests and Measurements in Industrial Education—3 cr.
(3 and 0)

A study of methods used in measuring and evaluating pupil achievement in Industrial Education subjects. Emphasis is on developing tests, project evaluation, standardized testing, and statistical treatment of test scores. Prerequisite: Math 303 and In Ed 303.

In Ed 416—Design and Operation of Industrial Education Laboratories—3 cr. (2 and 3)

A study of laboratory layout, selection and procurement of tools and equipment, budgeting, coordinating multiple activities in the general shop, and organizing course materials. Prerequisite: In Ed 303.

In Ed 422—Vocational Education Programs—3 cr. (3 and 0)

A comprehensive study of the types of vocational programs, financing, and administration and supervision. Prerequisite: In Ed 303.

In Ed 425—Teaching Industrial Subjects—3 cr. (3 and 0)

A study of effective methods and techniques of teaching industrial subjects. Emphasis is given to class organization, preparation of lesson outlines, and audio-visual aids. Prerequisite: Ed 335 and In Ed 303.
In Ed 432—Advanced Woodworking—2 cr. (1 and 3)
An advanced consideration of machine methods and developments, materials, quality factors, and evaluation of instructional materials and problems. Inspection trips and reports. Prerequisite: In Ed 302.

In Ed 435—Advanced Welding—2 cr. (1 and 3)
An advanced consideration of studies originated in In Ed 303, new developments, and evaluation of instructional materials and problems. Inspection trips and reports. Prerequisite: In Ed 303.

In Ed 436—Advanced Material Forming—2 cr. (1 and 3)
Advanced consideration of studies initiated in In Ed 301, developments, and evaluation of instructional materials and problems. Inspection trips and reports. Prerequisite: In Ed 301.

In Ed 438—Advanced Machining—2 cr. (1 and 3)
Advanced consideration of studies initiated in In Ed 401, new developments, industrial measurements, and evaluation of instructional materials and problems. Inspection trips and reports. Prerequisite: In Ed 401.

In Ed 441—Comprehensive General Shop Practices—2 cr. (1 and 3)
A study of the problems and administration of the comprehensive general shop program. Objective is to consider planning multiple activity programs for the secondary school level. Prerequisite: In Ed 416.

In Ed 442—Competency Testing in Vocational Subjects—3 cr. (3 and 0)
This course is especially designed for trade teachers who have assisted in making trade tests for S. C. Certification program. Teachers who expect to assist in making trade tests are also urged to enroll in this course. The course is devoted to revising present trade tests and developing tests in new fields. (Offered in Summer Sessions only.)

In Ed 446—Shop Planning and Layout—3 cr. (3 and 0)
This course is designed for shop teachers, coordinators, local supervisors, department heads and directors. The content covers the actual planning of unit shop and general shops for schools giving vocational trade and industrial arts courses, including machine layouts for various kinds of shops in order to make instruction effective. Emphasis is placed on all aspects of shop organization and management. (Offered in Summer Sessions only.)

In Ed 447—Curriculum Development in Industrial Education—3 cr. (3 and 0)
Basic consideration in curriculum construction, departmental coordination of subject matter with other school subject, curriculum modification, and staff organization in curriculum development. Prerequisite: In Ed 425.

In Ed 451—Problems in Vocational Education—3 cr. (3 and 0)
The expanding program of vocational education under the George-Barden Act and problems on national, state and local levels are discussed. Major specific problems involved in unit trade programs, out-of-school youth, selection and training of teachers, veterans' training and others are covered. (Offered in Summer Sessions only.)
IN ED 496—PUBLIC AND INDUSTRIAL RELATIONS FOR VOCATIONAL TEACHERS AND SUPERVISORS—3 cr. (3 and 0)

This course is to give vocational teachers the techniques and methods of effective public and industrial relations which will contribute to the understanding and cooperation of labor, business, professional, and industrial groups with the school program. (Offered in Summer Sessions only.)

IN ED 516—HISTORY AND PHILOSOPHY OF VOCATIONAL EDUCATION—3 cr. (3 and 0)

IN ED 561—ADMINISTRATION AND SUPERVISION OF VOCATIONAL EDUCATION—3 cr. (3 and 0)

IN ED 591—RESEARCH IN INDUSTRIAL EDUCATION—3 cr.

IN ED 596—RESEARCH IN INDUSTRIAL EDUCATION—3 cr.

INDUSTRIAL ENGINEERING

MR. LAITALA

MR. J. L. BROCK, MR. D. C. BROCK, MR. COUCH, MR. DUNKLE, MR. MEEKS, MR. MORGAN, MR. NEWTON

IE 101—MANUFACTURING PROCESSES—2 cr. (0 and 6)

Qualitative analysis of diverse manufacturing processes available to the engineer for generating geometrical and physical properties of materials required in engineering design. This course covers wood processes and pattern design, casting, heat treatment, forging, metal forming, welding, metal cutting, and other processes. Presented through lecture, demonstration, and laboratory work.

IE 201—MANUFACTURING PROCESSES—2 cr. (1 and 3)


IE 301—INTRODUCTION TO INDUSTRIAL ENGINEERING—3 cr. (3 and 0)

A systems analysis of engineering through critical study of governing criteria, modes of analysis, basic engineering plans, measures of engineering performance, interdependency of functional divisions of engineering, organization of the engineering process, and project administration. Prerequisite: IE 201 and Phys 212.

IE 302—METAL JOINING—2 cr. (1 and 3)

A study of the weldability of metals; choice of equipment and welding materials; pre-treatment and after-treatment of welds; inspection and testing; the economics of welding; safety considerations. Prerequisite: IE 101 and EG 108.

IE 303—JOB EVALUATION AND WAGE INCENTIVES—3 cr. (3 and 0)

An analysis of the mental and physical requirements, responsibilities and working conditions of jobs, and the several systems of determining the relative worth of jobs, including wage determination. Job evaluation plans and wage incentive systems and their maintenance. Prerequisite: IE 301 or IE 307 or IE 410.
IE 304—Motion and Time Study—3 cr. (2 and 3)
Fundamentals relating to individual work place analysis and design. Methods of reducing complex production systems into elemental operations. Principles of human motions. Fundamentals of measurement and their application to work measurement involving man and machine systems. Prerequisite: Phys 212 and Junior standing.

IE 306—Process Fundamentals—3 cr. (2 and 3)
Principles underlying the transformation of the geometry of materials by processes of material removal, forming, casting, and joining. Prerequisite: MetE 302 and IE 301.

IE 307—Survey of Engineering—3 cr. (3 and 0)
An examination of engineering in terms of types of fundamentals employed, governing parameters, basic plans, basic engineering functions, organization of divided engineering efforts, and measures of performance. Offered to students not majoring in engineering. Prerequisite: Phys 202 and Junior standing.

IE 401—Process Analysis and Control—3 cr. (2 and 3)
Process measurements and instruments. Application of statistical principles to analysis and control of production processes, studies of process capabilities, sampling inspection, work sampling, tolerance analysis, and machine interference. Prerequisite: Math 403, IE 306.

IE 403—Process Fundamentals—3 cr. (2 and 3)
Continuation of IE 306 and study of power requirements, tool forces, tool life, tool planning, machine programming methods. Prerequisite: IE 306, EM 304, ME 304.

IE 404—Engineering Economic Analysis—3 cr. (3 and 0)
Analysis of differences between engineering alternatives involving materials, processes, projects, machines, etc., short and long term investments, machine replacement, elements of manufacturing cost and cost allocation, project cost estimating. Introduction to operations research. Prerequisite: Senior standing in Engineering.

IE 407—Quality Control—3 cr. (3 and 0)
Study and application of statistical methods to control the quality in manufacture. Control chart fundamentals. Analysis of sampling plans and sampling tables. (For Engineering students not majoring in Industrial Engineering.) Prerequisite: Senior standing in Engineering.

IE 408—Plant Design—2 cr. (0 and 6)
Integration of unit operations into a total production system. Study of analytical procedures for determining layout of production and other facilities, line balance, manner in which operations shall be linked or material moved between them. Creation and analysis of alternative designs. Fundamentals of plant location. Prerequisite: Taken concurrently or preceded by IE 404 and IE 406.

IE 409—Professional Development and Thesis—2 cr. (1 and 3)
Library studies and oral reports covering recent technical developments in the field of Industrial Engineering. Consideration of professional responsibilities and post-graduation plans for self-improvement. Training in experi-
mental method through laboratory investigation and thesis. Prerequisite: Engl 301, IE 401.

IE 410—ENGINEERING AND ORGANIZATION—3 cr. (3 and 0)
A study of the nature of industrial enterprise in terms of purpose, organizational structure, governing criteria, responsibilities and relationships of various functional groups. Special emphasis is given to analysis, organization, and coordination of engineering functions. Prerequisite: Senior standing in Engineering.

IE 411—PRODUCTION CONTROL—3 cr. (3 and 0)
Fundamentals underlying the determination of production capacity requirements, economic lot sizes, and the regulating of flow and storage of materials to, within, and from the production system. Elements of forecasting, determination of materials requirements, scheduling, inventory control, etc. Consideration of data processing methods. Prerequisite: IE 403.

INDUSTRIAL MANAGEMENT

Mr. Trevillian

Mr. Davis, Mr. Edel, Mr. Whitehurst, Mr. Scott, Mr. LaRoche

IM 201—INTRODUCTION TO INDUSTRIAL MANAGEMENT—3 cr. (3 and 0)
An introductory survey of management’s role as a fourth factor of economic production. Fully one-third of the course is devoted to introducing the student to formal logic as an analytical tool in communication and decision making.

IM 301—COST ACCOUNTING—3 cr. (3 and 0)
The application of cost analysis to manufacturing and distributing problems. Analysis of the behavior characteristics of business costs and a study of principles involved in standard cost systems. Lectures and problems. Prerequisite: Acct 201 and 202.

IM 302—INDUSTRIAL MANAGEMENT—3 cr. (3 and 0)
Management problems and methods involved in the operation of manufacturing institutions, including location, equipment investment, organization structure, and budgets. Attention is given primarily to the above areas by the use of the case method. Emphasis on oral and written communication. Prerequisite: Junior standing.

IM 304—QUALITY CONTROL—3 cr. (3 and 0)
A study of basic control techniques in the field of industrial production, inspection and experimentation. Various sampling, control and inspection problems are studied with special reference to practical applications. Underlying theory, assumptions and limitations are presented. Prerequisite: Math 303.

IM 305—INCOME TAXATION—3 cr. (3 and 0)
Interpretation of Federal Income Tax laws, regulations, and court decisions with practice in application of these laws to the returns of individuals, partnerships, and corporations. Prerequisite: Junior standing.

IM 306—CORPORATION FINANCE—3 cr. (3 and 0)
A study of the organization and operation of corporations with emphasis on the nature and influences of the various sources of funds. Prerequisite: Junior standing.
IM 307—Personnel Management—3 cr. (3 and 0)
An introductory course dealing with the principles and policies governing present day employee-employer relationships. Attention directed to methods of electing, training, placing, and promoting of employees to develop sound personnel techniques. Prerequisite: Junior standing.

IM 308—Marketing—3 cr. (3 and 0)
An examination of the activities involved in the flow of goods and services from the producer to the consumer. A study of the basic functions of marketing and the problems involved in the operation of market institutions. Particular emphasis on the industrial phases of the above. Prerequisite: Econ 202.

IM 402—Production Planning and Control—3 cr. (3 and 0)
Methods of controlling the flow of personnel, machines and materials by means of scheduling, dispatching and routing. Includes a study of layout of equipment and facilities within the factory, and methods of materials handling. Prerequisite: Senior standing.

IM 403—Special Problems—2 cr. (2 and 0)
Each student will plan and develop a research project related to the field of management. Prerequisite: Senior standing in Industrial Management.

IM 404—Managerial Economics—3 cr. (3 and 0)
Includes an introduction to statistical decision theory, econometrics, and quantitative applications of economic tools in his role as decision maker and forward planner. Prerequisite: Econ 314 and Senior standing.

IM 405—Economics of Transportation—3 cr. (3 and 0)
History and structure of transportation systems of the United States; the nature of transportation costs and rates. Transportation systems as factors in industrial location. Government policy towards transportation. Prerequisite: Senior standing and permission of the instructor.

IM 406—Theory of Industrial Location—3 cr. (3 and 0)
A theoretical study of the general factors which determine plant location in a capitalist society. Particular attention would be paid to the selection of location sites by small nonbranch manufacturing plants. A comparison of location theory and actual location patterns would be stressed. Prerequisite: IM 405.

IM 407—Special Problems—1 cr. (1 and 0)
Each student will plan and develop a research project related to the field of management. Prerequisite: Senior standing in Industrial Management.

IM 408—Work Simplification and Standardization—3 cr. (3 and 0)
Principles and practices of motion and time as it is applied to industry. Emphasis is given to its application and its influence on methods, material handling, plant layout, and time study procedures. (For students not majoring in Engineering.)

IM 501—Quantitative Economic Analysis—3 cr. (3 and 0)
IM 502—Finance—3 cr. (3 and 0)
IM 503—Production Management—3 cr. (3 and 0)
IM 504—Managerial Policy—3 cr. (3 and 0)
IM 505—Quality Control—3 cr. (3 and 0)
IM 591—Thesis—3 cr.
IM 592—Thesis—3 cr.

MATHEMATICS

Mr. Sheldon

Mr. Hind, Mr. Bell, Mr. Brown, Mr. Coker, Mr. Harden, Mr. Kirkwood, Mr. Lagrone, Mr. Palmer, Mr. Park, Mr. Rife, Mr. Stanley, Mr. Stuart, Mr. Sullivan, Mrs. Dunkle, Mr. Flatt, Miss Hardy, Mr. King, Mr. Schindler, Mr. Stritzinger, Mr. Tilley, Mrs. Bartmess, Mrs. Fulmer

Math 100—Remedial Mathematics—Non-Credit (5 and 0)
Required of all freshmen who fail to make a satisfactory grade on the placement examination in mathematics. An intensified review of high school algebra. Students enrolled in Math 100 must receive a passing grade in this course before they are eligible to enroll in Math 105. Any student who has passed a course in freshman mathematics is ineligible to enroll in Remedial Mathematics.

Math 101—Mathematical Analysis—3 cr. (3 and 0)
An introductory course in college mathematics for students who enroll in curriculums that provide for only one year of mathematics. The subject matter includes graphing, differentiation, integration, solution of equations, trigonometry, exponential functions, series, and probability.

Math 102—Mathematical Analysis—3 cr. (3 and 0)
A continuation of Math 101.

Math 105—Algebra and Trigonometry—4 cr. (4 and 0)
A unified course in algebra and trigonometry. Prerequisite: A satisfactory grade on the placement examination.

Math 106—Analytic Geometry and Calculus I—4 cr. (4 and 0)
A unified course in analytic geometry and calculus presented in three semesters. Prerequisite: Math 105 or equivalent.

Math 186—Analytic Geometry and Calculus I—4 cr. (4 and 0)
Same as Math 106 except that this honors section is open to students only by invitation.

Math 200—Analytic Geometry and Calculus—3 cr. (3 and 0)
A continuation of Math 106 as a special course for industrial management majors.

Math 205—Analytic Geometry and Calculus II—4 cr. (4 and 0)
A continuation of Math 106.

Math 206—Analytic Geometry and Calculus III—4 cr. (4 and 0)
A continuation of Math 205.

Math 285—Analytic Geometry and Calculus II—4 cr. (4 and 0)
A continuation of Math 186.

Math 286—Analytic Geometry and Calculus III—4 cr. (4 and 0)
A continuation of Math 285.

Math 302—Theory of Equations—3 cr. (3 and 0)
Complex numbers, theorems on roots of polynomial equations, approximations, determinants, matrices and symmetric functions. Prerequisite: Math 206.
Math 303—Statistics—3 cr. (3 and 0)
Descriptive statistics, elementary probability, sampling distributions, normal distribution, point and interval estimation, testing of hypotheses, correlation and regression. Prerequisite: Math 106.

Math 306—Ordinary Differential Equations—3 cr. (3 and 0)
Linear equations with constant coefficients, simultaneous equations, linear equations of second order, series solutions, applications to physics and engineering. Prerequisite: Math 206.

Math 307—Elementary Partial Differential Equations—3 cr. (3 and 0)
Partial differentiation and space geometry, origins of partial differential equations, linear and non-linear equations of the first order, Fourier series, linear equations of the second and higher orders. Prerequisite: Math 306.

Math 308—College Geometry—3 cr. (3 and 0)
Theorems and concepts more advanced than those of high school geometry. A treatment of the various properties of the triangle, including the notable points, lines, and circles associated with it. Prerequisite: Math 106.

Math 310—Programming the Digital Computer—2 cr. (1 and 3)
Programming techniques for the RPC 4000. Assembly routines and the use of a compiler are included. Prerequisite: Math 206 or the permission of the instructor.

Math 311—Introduction to Modern Algebra—3 cr. (3 and 0)
An introduction to the concepts of algebra. Topics included are: the number system; elementary theory of groups; rings, integral domains, and fields; matrices over a field; determinants and matrices; groups, rings, and ideals. Prerequisite: Math 206.

Math 386—Ordinary Differential Equations—3 cr. (3 and 0)
Honors section in Math 306.

Math 402—Theory of Probability—3 cr. (3 and 0)
A study is made of mathematical models of random phenomena, the theory of counting sets of n-tuples, mean and variance of a probability law, law of large numbers, the Stieltjes integral. The course includes a study of normal, Poisson, and related probability laws. Prerequisite: Math 206 and Junior standing.

Math 403—Mathematical Statistics—3 cr. (3 and 0)
Probability, frequency functions, empirical and theoretical frequency distributions, moment generating functions, large-sample theory and applications, correlation and regression. The course includes practical methods as well as the mathematical theory necessary to the understanding and judicious application of those methods. Prerequisite: Math 206 and Junior standing.

Math 404—Mathematical Statistics—3 cr. (3 and 0)
A continuation of Math 403. Goodness of fit, testing of hypotheses and estimation, small-sample distributions, design of experiments, analysis of variance, non-parametric methods. Prerequisite: Math 403.

Math 409—Theory of Approximations—3 cr. (2 and 3)
Approximation techniques using tables and calculators; numerical solutions to equations; approximations with series; error analysis; elements of numerical
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differentiation and integration; Boolean Algebra, binary operations, applications to data reduction and computer theory. Prerequisite: Math 206 and Junior standing.

Math 451—Vector Analysis—3 cr. (3 and 0)
The algebra and calculus of vectors in two and three dimensions with applications to physics, geometry and engineering problems. Prerequisite: Math 306 and Junior standing.

Math 452—Linear Programming—3 cr. (3 and 0)
An introduction to linear programming, using elementary matrix algebra and the theory of convex polygons. Applications to managerial problems, operations research, economic behavior, the theory of games and military strategy are considered. Prerequisite: Math 206 or permission of the instructor.

Math 453—Advanced Calculus—3 cr. (3 and 0)
Limits, continuity, and differentiation of functions of one and several variables, the Riemann integral, and vector analysis. Prerequisite: Math 306 and Junior standing.

Math 454—Advanced Calculus—3 cr. (3 and 0)
A continuation of Math 453. Transformations, multiple integrals, line and surface integrals, infinite sequences and series, and improper integrals.

Math 455—Laplace Transforms—3 cr. (3 and 0)
Elementary properties of transforms of real functions; development and use of tables of transforms and inverses; applications to ordinary differential equations and linear partial differential equations. Prerequisite: Math 306.

Math 502—Theory of Matrices—3 cr. (3 and 0)
Math 503—Theory of Functions of Complex Variables I—3 cr. (3 and 0)
Math 504—Theory of Functions of Complex Variables II—3 cr. (3 and 0)

Math 505—Numerical Analysis—3 cr. (3 and 0)
Math 506—Calculus of Finite Differences—3 cr. (3 and 0)
Math 508—Fourier Series—3 cr. (3 and 0)
Math 509—Operational Mathematics—3 cr. (3 and 0)
Math 515—Projective Geometry—3 cr. (3 and 0)
Math 516—Tensor Analysis—3 cr. (3 and 0)
Math 520—Research Techniques—3 cr. (3 and 0)
Math 551—Fundamental Concepts in Mathematics I—3 cr. (3 and 0)
Math 552—Fundamental Concepts in Mathematics II—3 cr. (3 and 0)
Math 591—Research—3 cr.
Math 592—Research—3 cr.
MECHANICAL ENGINEERING

Mr. Cook

Mr. Bradbury, Mr. Edwards, Mr. Lewis, Mr. Watson, Mr. A. C. Elrod,
Mr. Hammond, Mr. Hudson, Mr. Perry, Mr. W. C. Elrod,
Mr. Johnson, Mr. Yang

ME 214—Engineering Problems—1 cr. (0 and 3)
Designed to develop an analytical approach to the solution of engineering
problems at an elementary level. Prerequisite: Sophomore standing, Math 106,
and enrollment in Phys 211.

ME 302—Elementary Thermodynamics—3 cr. (3 and 0)
An engineering science course for those curriculums requiring only one course
in thermodynamics. The laws of thermodynamics with applications to general
engineering systems. Prerequisite: Junior standing, Phys 212, Math 206.

ME 304—Heat Transfer I—3 cr. (3 and 0)
A comprehensive study of the principles of heat transmission with applica-
tions to engineering problems. Special emphasis is given to the following
topics: heat conduction in the steady and unsteady states; dimensional analysis
of convection; free and forced convection; the combined effects of conduction,
convection and radiation. Prerequisite: Junior standing, ME 302 or ME 311,
or Ch 336, Math 306.

ME 307—Mechanical Engineering Laboratory—1 cr. (0 and 3)
For those curriculums requiring one course in Mechanical Engineering
Laboratory. The course is intended to illustrate mechanical engineering theory
and to develop experimental technique. Experiments in the fields of heat
power, heat transfer, refrigeration and air conditioning and turbo-machinery
are covered. Prerequisite: ME 302.

ME 311—Engineering Thermodynamics I—3 cr. (3 and 0)
A required course for junior mechanical engineers. May be taken by selected
electrical, industrial, civil, and agricultural engineers as a substitute for ME
302. Its objective is to give a thorough grasp of the power and versatility of
application of the first and second laws of thermodynamics. Prerequisite:
Math 206, Phys 212, and Junior standing.

ME 312—Engineering Thermodynamics II—3 cr. (3 and 0)
A continuation of ME 311. Prerequisite: ME 311.

ME 313—Instrumentation and Measurements—1 cr. (0 and 3)
Principles of measurements, accuracy of instruments, and data analysis.
Modern instruments for measuring and recording static and dynamic pressures,
temperatures, fluid flow, speed, power, and torque. Prerequisite: Enrollment
in ME 311.

ME 314—Mechanical Engineering Laboratory—1 cr. (0 and 3)
Application of engineering theory to steady flow equipment, energy balances,
and instrumentation. Prerequisite: ME 311.

ME 316—Kinematics and Dynamics of Machines—3 cr. (2 and 3)
A study of the displacements, velocities, accelerations and forces encoun-
tered in the analysis of machines. The application of these fundamentals to the
analysis of linkage and cams; to gearing; and to miscellaneous mechanisms. \textit{Prerequisite:} EM 303.

\textbf{ME 401—Fundamentals of Machine Design—3 cr. (3 and 0)}

Studies in making decisions. Development of creative ability in the synthesis of machines and machine elements. The role of stress, strain, and vibrations. Selection of materials. Special emphasis is given to fatigue and combined stresses applied to modern machinery. \textit{Prerequisite:} ME 316, EM 304, Senior standing, concurrent registration in MetE 302.

\textbf{ME 402—Mechanical Engineering Design—3 cr. (1 and 6)}

A synthesis course requiring the student to make decisions based on his previous education and experience in the design of one or more engineering systems or devices. \textit{Prerequisite:} ME 304, ME 312, ME 401, EE 308, EE 310, Senior standing.

\textbf{ME 403—Gas Dynamics—3 cr. (3 and 0)}

Basic concepts, fundamental equation of steady flow, isentropic flow, flow with heat transfer, flow with friction, wave phenomena, variable area flow and introduction to multidimensional flow. Taught second semester only. \textit{Prerequisite:} ME 312, EM 401, Senior Engineering standing.

\textbf{ME 404—Automatic Control Engineering—3 cr. (3 and 0)}

Study of characteristics of processes and controllers, as applied to closed loop feed back control systems. Transient, sinusoidal and stability analysis. Taught second semester only. \textit{Prerequisite:} Math 306, EM 401, ME 312, ME 304, Senior Engineering standing.

\textbf{ME 405—Seminar—1 cr. (1 and 0)}

A course designed to acquaint the student with the latest research, development, and publications in the field of mechanical engineering. A library research paper is required of each student. \textit{Prerequisite:} Senior Engineering standing.

\textbf{ME 407—Heat Transfer II—3 cr. (3 and 0)}

An engineering science course dealing with the transfer of energy. This course is designed to supplement and extend the material covered in ME 304. A rigorous study of conduction, convection, and radiation including transient and periodic heat transfer and an introduction to mass and momentum transport phenomena. Taught first semester only. \textit{Prerequisite:} ME 304, Math 306, and Senior standing.

\textbf{ME 408—Design of Machine Elements—3 cr. (2 and 3)}

Design of machines and machine components, including analysis synthesis, layout, and reports. A synthesis course with emphasis on making decisions. \textit{Prerequisite:} ME 401.

\textbf{ME 411—Gas Power—3 cr. (3 and 0)}

A senior synthesis course designed to apply the applicable phases of the basic and engineering sciences. Theoretical and actual cycles, performance characteristics, fuels, combustion, equilibrium, cooling, dynamics. Taught first semester only. \textit{Prerequisite:} ME 304, 312, EM 401, and Senior standing.

\textbf{ME 412—Steam Power—3 cr. (3 and 0)}

A senior synthesis course designed to apply the basic and engineering sciences. Topics stressed are the design, arrangement and economic justification
of steam power plant equipment. Taught second semester only. \textit{Prerequisite:} ME 304, 312, EM 401, and Senior standing.

ME 413—MECHANICAL ENGINEERING LABORATORY—1 cr. (0 and 3)
A senior laboratory course for mechanical engineers intended to develop ability to devise experiments which will yield essential data. Interpretation of results and skill in written presentation of engineering information are stressed. The course illustrates mechanical engineering theory in the fields of heat power, refrigeration and air conditioning, heat transfer and turbo-machinery. Taught first semester only. \textit{Prerequisite:} ME 304, ME 312, ME 314 and Senior Mechanical Engineering standing.

ME 414—MECHANICAL ENGINEERING LABORATORY—1 cr. (0 and 3)
A continuation of ME 413. Taught second semester only. \textit{Prerequisite:} ME 304, ME 312, ME 314, and Senior Mechanical Engineering standing.

ME 421—INTERNAL COMBUSTION ENGINES—3 cr. (3 and 0)
Internal combustion engine process analysis, deviation from the ideal process, carburetion, fuel injection. A general study of both the design and the operating variables. Detailed analysis of the thermochemical processes and associated effects of dissociation. \textit{Prerequisite:} ME 411 or equivalent.

ME 422—PRINCIPLES OF TURBOMACHINERY—3 cr. (3 and 0)
A study of the guiding principles underlying all forms of turbomachinery. A unified treatment of turbomachinery to include pumps, fans, compressors and steam, gas and hydraulic turbines. Dimensional analysis as applied to turbomachinery, Euler’s Equation, concepts of specific speed and thermodynamics of turbomachinery processes and allied topics are covered. Taught first semester only. \textit{Prerequisite:} Senior Engineering standing, ME 304, 312 and EM 401.

ME 423—INTERNAL COMBUSTION ENGINE ANALYSIS—1 cr. (0 and 3)
Analysis of latest technical articles on I. C. engines. Students report on selected articles. Students must give reasons for the new process or method described, supported by basic theory. Each student then selects a field of interest for his own analysis problem and with suggestions from instructor completes an analysis and reports his findings to the class. \textit{Prerequisite:} Senior Mechanical Engineering standing and enrollment in ME 411.

ME 424—ENGINEERING ANALYSIS—2 cr. (1 and 3)
To develop the student’s capacity to deal with new situations by applying initiative, analytical thought processes, and fundamental principles. Problems actually confronted by practicing engineers are covered. Taught first semester only. \textit{Prerequisite:} ME 302 or ME 312, ME 304, and Senior Engineering standing.

ME 429—AIR CONDITIONING—3 cr. (3 and 0)
A senior synthesis course designed to apply the principles of the applicable phases of the basic and engineering sciences. A study of the principles of heating and air conditioning, including calculation of heat loss and heat gains for buildings, heating and cooling systems, psychrometric principles, air distribution, refrigeration and automatic control apparatus. Taught first semester only. \textit{Prerequisite:} ME 304, 312, and Senior standing.

ME 430—AIR CONDITIONING DESIGN—1 cr. (0 and 3)
A practical application of the theory covered in ME 429. \textit{Prerequisite:} Enrollment in ME 429.
ME 433—Elementary Aerodynamics—3 cr. (3 and 0)
The study of the flow of incompressible inviscid fluids in two dimensions. The vector flow field, Gauss’s Theorem, Stoke’s Theorem, the velocity potential and stream function. Euler’s Equation applied to incompressible fluids, superposition of flows. Prerequisite: ME 312, EM 401.

ME 434—Refrigeration—2 cr. (2 and 0)
A thermodynamic analysis of the principles of refrigeration; a study of the design, operating principles and application of compression, absorption and steam jet systems of refrigeration. Prerequisite: ME 304 and ME 312.

ME 464—Lubrication—2 cr. (2 and 0)
Application of hydrodynamic and hydrostatic theory to the design and analysis of journal and thrust bearings. Prerequisite: ME 401.

ME 501—Advanced Air Conditioning—3 cr. (3 and 0)
ME 510—Advanced Thermodynamics—3 cr. (3 and 0)
ME 511—Advanced Gas Dynamics—3 cr. (3 and 0)
ME 512—Boundary Layer Theory—3 cr. (3 and 0)
ME 524—Propulsion Systems—3 cr. (3 and 0)
ME 532—Applied Heat Transfer—3 cr. (3 and 0)
ME 534—Advanced Heat Transfer—3 cr. (3 and 0)
ME 591—Research—3 cr.
ME 592—Research—3 cr.

METALLURGICAL ENGINEERING
Mr. Thomas, Mr. McCormack

MetE 202—Introduction to Metallurgy—3 cr. (3 and 0)
A survey of the field of metallurgical operations, extractive, mechanical and physical. Designed to acquaint the student with the various fields of operation and provide basic information for more advanced courses.

MetE 220—Extractive Metallurgy—3 cr. (3 and 0)
A study of the processes used to reduce ore to metal. This course is a survey of both the ferrous and non-ferrous extractive processes. Pyrometallurgical, electrometallurgical and hydrometallurgical processes will be studied.

MetE 301—Physical Metallurgy—3 cr. (2 and 3)
The first of two sequential courses to acquaint the student with the nature and properties of metals. The properties of metals are defined and studied. Fundamental solid state physics which explains how and why metals have the useful properties that they do possess are considered. Basic metal forming processes, using these principles, are studied. Prerequisite: MetE 202 or 302.

MetE 302—General Metallurgy—3 cr. (3 and 0)
Basic general metallurgy for students in Engineering and related curricula. This course is designed to acquaint students with the properties of metals so that they may select intelligently for engineering applications. The nature of metals and of metal working processes are considered. Prerequisite: Junior standing in Engineering.
MetE 304—Physical Metallurgy—3 cr. (2 and 3)
A continuation of MetE 301. In this portion alloys are considered particularly. The use of an alloy diagram to represent properties and phases. The student learns to construct and interpret alloy diagrams. Solid state phase changes are studied, such as occur in the heat treating of steel and the age hardening of aluminum alloys. Prerequisite: MetE 301.

MetE 320—Mechanical Metallurgy—2 cr. (2 and 0)
A study of the processes whereby useful shapes are formed in metal, and the response of the metal to the deformative forces. Rolling, forging, extrusion, drawing and "high energy" are studied. The effects of these forces on the character and properties of the metal are evaluated. Prerequisite: MetE 304 or consent of instructor.

MetE 323—Metallography—2 cr. (1 and 3)
The development of techniques necessary for metallographic investigations. The selection of cutting, mounting and polishing the specimens; the use of the microscope; the techniques of etching; and of photography. Prerequisite: MetE 304, or MetE 320 and consent of instructor.

MetE 350—Metallurgy of Cast Metals—3 cr. (2 and 3)
The fundamentals of melting, fluxing, pouring, and the control of the solidification of metals in molds. The metallurgical aspects of the production of castings in sand molds, permanent molds, shell molds, die casting, and centrifugal casting. Studies of the physical properties of castings. Prerequisite: MetE 302.

MetE 402—Metallurgical Literature—1 cr. (0 and 3)
To acquaint the student with sources of information on metallurgy. To develop a background for the senior thesis. Prerequisite: Senior standing in Metallurgical Engineering.

MetE 408—Heat Treating—3 cr. (2 and 3)
A study of the phase changes in both ferrous and non-ferrous metals caused by changes in environment at significant times in the processing. Studies relating the time-temperature changes in metals with their physical properties. Prerequisite: MetE 302.

MetE 423—Metallography—2 cr. (1 and 3)
The development of the techniques necessary for metallographic investigations. The selection of cutting, mounting, and polishing specimens; the use of microscopes; the techniques of etching, and of photographing. Prerequisite: Senior standing in Engineering and MetE 302.

MetE 425—Senior Thesis—2 cr. (0 and 6)
The investigation of a research project in Metallurgical Engineering. A competent bachelor thesis is required. Prerequisite: MetE 220, MetE 304, MetE 402 and Senior standing.

MetE 430—Powder Metallurgy—3 cr. (2 and 3)
The production of metal powders and of articles from these powders. By powder metal techniques it is possible to produce controlled porosity, unconventional alloys and to produce complex parts of limited size rapidly, accurately, and economically. Combinations of metals and non-metals may be produced. Prerequisite: Senior standing in Engineering and MetE 302.
MetE 440—Metallurgy of Reactor Materials—3 cr. (2 and 3)
The metallurgy of materials used in reactor construction. The physical metallurgy of metallic fuels, controls, reflectors, and shielding. The effects of radiation on structural metals will be considered. Prerequisite: Senior standing and the consent of the instructor.

MetE 450—Metallic Corrosion—3 cr. (2 and 3)
The theory of corrosion in metallic materials and means of preventing corrosion. Prerequisite: Senior standing in Engineering and MetE 302.

MetE 455—Electro-Metallurgy—3 cr. (2 and 3)
The electrowinning and electrorefining of metals. Electrothermic cells will be studied. The principles and operation of electric furnaces will be considered. Electroplating and electroetching will be studied. For metallurgy majors. Prerequisite: Senior standing in Engineering and MetE 302.

MILITARY SCIENCE
Colonel McDowell

MS 101—Fundamentals (Basic)—1 cr. (2 and 1)
Introduction to organization, equipment, and mission of Reserve Officers Training Corps and the U. S. Army, with detailed study of smaller units and basic aims and discussion seminar on current events. Laboratory periods provide training in basic drill, discipline, and leadership.

MS 102—Army and National Security (Basic)—1 cr. (2 and 1)
Organization of Department of Defense, roles and missions of the Armed Forces with particular emphasis on U. S. Army. Effects of modern weapons, including chemical, biological, and radiological, with sub-course on mass casualty treatment, first aid, and effective communication. Current events seminar. Drill.

MS 201—American Military History (Basic)—1 cr. (2 and 1)
A survey of American military history from the origins of the American Army to the present, with emphasis on the factors which led to the organizational, tactical, logistical, operational, strategic, social, and similar patterns found in our present-day Army.

MS 202—Introduction to Operations and Basic Tactics and Map and Aerial Photograph Reading (Basic)—1 cr. (2 and 1)
An introduction to the organization, composition, and mission of the infantry rifle squad and small infantry-tank teams. Interpretation and use of maps and aerial photographs in study and evaluation of terrain.

MS 301—Military Science (Advanced)—3 cr. (3 and 1)
Theoretical and practical training in the responsibilities and basic qualities of a leader; educational techniques and psychology; and the roles of the combat arms and technical and administrative services of the Army. Further training
for duty as officers by application of principles of leadership in actual command during drills, parades, reviews, inspections and ceremonies.

**MS 302—MILITARY SCIENCE (ADVANCED)—3 cr. (3 and 1)**

A continuation of MS 301. Study and practical application of the techniques of organization, control, and employment of military units with particular attention to personnel management and the application of leadership principles in directing small tactical units. A study and familiarization with principles and means of electrical and other methods of communication. Additional leadership training.

**MS 401—MILITARY SCIENCE (ADVANCED)—3 cr. (3 and 1)**

A study of advanced subjects of leadership command, and staff, which when correlated with other college courses and disciplines, will develop the individual character and attributes essential to an officer. Applicatory phases of leadership are stressed throughout.

**MS 402—MILITARY SCIENCE (ADVANCED)—3 cr. (3 and 1)**

The functions of staff and command. Aspects of military service which help student adjust to requirements of active duty as an officer in the United States Army. Student participation emphasized.

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**MUSIC**

**Mr. McGarity, Mr. Butler**

**Music 103—Class Basic Piano—1 cr. (0 and 3)**

Designed for beginning piano students meeting in groups as large as eight for three one-hour periods each week. The emphasis is on basic technique and rudiments essential for a successful initial keyboard experience. No previous training in music is required.

**Music 104—Class Basic Piano—1 cr. (0 and 3)**

A sequel of Music 103 in which piano students meet in groups as large as eight for three one-hour periods each week. The emphasis is on basic technique and rudiments essential for successful experience in the performance at the piano of music suitable for community sings and similar functions. Students may enroll in Music 104 without having taken Music 103 only by permission of the instructor.

**Music 310—Music Appreciation: Music in the Western World—3 cr. (3 and 0)**

A course designed to widen and deepen the student's appreciation of his musical heritage through a study of the development of music in Western culture from the time of the early Christians to the present. Not open to students who have taken Music 402.

**Music 400—Music in the Elementary School Classrooms—3 cr. (3 and 0)**

Designed to give the teacher in the elementary school a familiarity with music suitable for use with children at the elementary level. Recordings of appropriate music, pre-band instruments, unison and part singing will be included. No previous training in music is required. (Offered in Summer Sessions only.)
Philosophy

Music 405—Music Theory—3 cr. (3 and 0)
The principles of notation, its symbols and abbreviations, major and minor scales, intervals and chords, measure, rhythm and tempo, and the terminology of music are the principal topics covered in this course.

Music 411—American Music: Music Appreciation—3 cr. (3 and 0)
A study of music in America from 1620 to the present. Indigenous and borrowed influences will be examined.

**PHILOSOPHY**

Mr. Edwards

Phil 301—Introduction to Philosophy—3 cr. (3 and 0)
An analysis of the major problems and systems of philosophy. **Prerequisite:** Junior standing and permission of instructor.

Phil 302—Logic—3 cr. (3 and 0)
An introduction to the methods and techniques of logic and continuing to elementary symbolic logic.

**PHYSICS**

Mr. Huff

Mr. Lindsey, Mr. J. E. Miller,* Mr. C. A. Reed, Mr. A. R. Reed, Mr. Vogel,
Mr. Wood, Mr. Chaplin, Mr. M. G. Miller, Mr. Shackelford,
Mr. Skove, Mr. Stillwell, Mr. Carter, Mr. Collins,
Mr. Gilreath

Phys 201—General Physics—3 cr. (3 and 0)
Motion; equilibrium; the conservation of momentum, mass and energy; vibrations; waves; temperature and heat. **Prerequisite:** Registration in Phys 203.

Phys 202—General Physics—3 cr. (3 and 0)
A continuation of Phys 201: Optics of lenses and mirrors; light waves; electric charges and currents, magnetism, electric and magnetic fields; properties of atomic particles; structure of atoms. **Prerequisite:** Phys 201 and registration in Phys 204.

Phys 203—General Physics Laboratory—1 cr. (0 and 3)
Experiments designed to test or exemplify the laws studied in Phys 201 and to introduce precision measuring instruments. **Prerequisite:** Registration in Phys 201.

Phys 204—General Physics Laboratory—1 cr. (0 and 3)
A continuation of Phys 203 using optical and electrical instruments. **Prerequisite:** Registration in Phys 202.

Phys 211—General Physics for Engineers and Scientists—4 cr. (4 and 0)
Mechanics, sound and heat, including the laws of motion; rotation; equilibrium; vibratory and wave motion; mechanical and thermal properties of solids, liquids and gases; with emphasis on the solution of problems. **Prerequisite:** Math 106; registration in Phys 213.

* On leave.
Phys 212—General Physics for Engineers and Scientists—4 cr. (4 and 0)
A continuation of Phys 211 covering the laws of electric and magnetic fields; electric currents and circuits; geometrical and physical optics; spectra; atomic physics. Prerequisite: Phys 211; registration in Phys 214.

Phys 213—General Physics Laboratory—1 cr. (0 and 3)
Experiments based on the laws studied in Phys 211, the theory and use of precise measuring apparatus, the treatment of observed data and significant figures. Prerequisite: Registration in Phys 211.

Phys 214—General Physics Laboratory—1 cr. (0 and 3)
A continuation of Phys 213 with emphasis on the accurate measurement of electrical quantities and the properties of light. Prerequisite: Registration in Phys 212.

Phys 281—General Physics for Engineers and Scientists—4 cr. (4 and 0)
Honors section in Phys 211.

Phys 282—General Physics for Engineers and Scientists—4 cr. (4 and 0)
Honors section in Phys 212.

Phys 304—Descriptive Astronomy—3 cr. (3 and 0)
The properties of the planets and their satellites, their actual and apparent motions; the properties of stars and galaxies; current theories and speculations. Prerequisite: Phys 202 or 212.

Phys 305—Photography—3 cr. (2 and 3)
Various phases of photography including photographic optics, sensitivity of negative materials, making prints and enlargements, composition of pictures. Prerequisite: Phys 202 or 212; permission of the instructor.

Phys 308—Sound and Acoustics—3 cr. (3 and 0)
Production, propagation, properties and measurement of sound waves with emphasis on the acoustics of buildings. Prerequisite: Phys 202 or 212; registration in Math 205.

Phys 321—Mechanics I—3 cr. (3 and 0)
Statics; motions of particles and rigid bodies; vibratory motion; gravitation; properties of matter, flow of fluids. Prerequisite: Phys 212, registration in Math 306.

Phys 323—Experimental Mechanics—1 cr. (0 and 3)
Precise measurements of mass, length and time; experiments with pendulums, gyroscopes, fluid flow; determination of the gravitational constant. Prerequisite: Registration in Phys 321.

Phys 332—Light—3 cr. (3 and 0)
A study of images formed by mirrors and lenses; aberrations; the effect of stops and the design of optical instruments. Application of Maxwell's equations to optical problems. Interference phenomena. Prerequisite: Phys 202 or 212; Math 206.

Phys 341—Electricity and Magnetism—3 cr. (3 and 0)
Electric circuits; electromagnetic induction; properties of capacitors and inductors as circuit elements; A.C. circuit problems by vector methods and by use of complex numbers; electrostatic fields. Prerequisite: Phys 212; Math 206.
PHYS 343—ELECTRICAL MEASUREMENTS—2 cr. (1 and 3)
Theory and practice of electrical measurements. Measurements with precision electrical instruments including potentiometers, bridges and ballistic galvanometers; includes both D.C. and A.C. measurements. Prerequisite: Registration in Phys 341.

PHYS 351—INTRODUCTION TO MODERN PHYSICS—3 cr. (3 and 0)
The properties of electrons, protons and other atomic particles; elementary quantum theory and its applications to photoelectric effect, X-rays and Bohr theory of atomic structure. Prerequisite: Phys 212, registration in Math 306 or permission.

PHYS 353—MODERN PHYSICS LABORATORY—1 cr. (0 and 3)
Measurements of the charge and mass of the electron, studies of thermo and photo-electric effects, measurements with radioactive materials and with X-rays. Prerequisite: Registration in Phys 351.

PHYS 401—SENIOR THESIS—3 cr. (1 and 6)
The senior thesis is a semi-original piece of work performed under the direction of a member of the physics staff. The project is done in any one of the various fields of physics, but is usually associated with X-ray studies, electron microscopy, electronics or spectroscopy. Prerequisite: At least three Physics courses beyond General Physics.

PHYS 404—ASTRODYNAMICS—3 cr. (3 and 0)
Astronomical coordinate systems, orbit determinations, multiple body problems, perturbations, non-gravitational and relativistic effects and observational theory. Special attention to problems of artificial satellites. Prerequisite: Phys 321.

PHYS 421—MECHANICS II—3 cr. (3 and 0)
Dynamics of particles and of rigid bodies, Lagrangian and Hamiltonian formulations, vibrations of strings, wave propagation. Prerequisite: Phys 321 or permission of instructor.

PHYS 432—PHYSICAL OPTICS AND INTRODUCTION TO SPECTROSCOPY—3 cr. (3 and 0)

PHYS 434—OPTICS LABORATORY—1 cr. (0 and 3)

PHYS 441—ELECTRICITY AND MAGNETISM—3 cr. (3 and 0)
Electric potential; properties of dielectrics; magnetic fields due to moving charges; magnetic properties of materials; Maxwell’s field equations with applications. Vector analysis is used throughout. Prerequisite: Phys 341 or equivalent; registration in Math 306.
Phys 452—Introductory Nuclear Physics—3 cr. (3 and 0)
Various phases of nuclear physics including natural and induced radioactivity; properties of alpha, beta and gamma-rays; cosmic rays; nuclear energy levels and decay schemes; particle accelerators, fission, fusion and nuclear reactors. Prerequisite: Phys 351.

Phys 454—Nuclear Physics Laboratory—1 cr. (0 and 3)
Techniques and instruments used in detection and measurement of nuclear radiation. Experiments include half-life determination, absorption measurements, neutron activation, coincidence measurements, decay schemes, and gamma-ray spectroscopy. Prerequisite: Registration in Phys 452.

Phys 455—Modern Physics II—3 cr. (3 and 0)
Elements of relativity theory and quantum mechanics with application to the properties of atoms, molecules and solids. Prerequisite: Phys 351 or permission of instructor.

Phys 460—Modern Physics for High School Teachers—3 cr. (3 and 0)
A study of later developments including the measurements of atomic particles. The formulation of new laws and the modifications of old ideas needed to describe the interactions of these particles.

Phys 465—Heat and Thermodynamics—4 cr. (4 and 0)
A study of temperature, development of the laws of thermodynamics and their application to thermodynamic systems. An introduction to low temperature physics is given. Prerequisite: Six hours of physics beyond Phys 212, Math 306 or permission.

Phys 471—Electron Microscopy—3 cr. (2 and 3)
The theory and operation of the electron microscope. Magnetic lens theory. The technique of specimen mounting and the interpretation of electron micrographs and diffraction patterns. Each student may choose specimens from his major field. Prerequisite: General Physics, Math 206 and permission of instructor.

Phys 501—Physics for High School Teachers I—3 cr. (3 and 0)

Phys 502—Physics for High School Teachers II—3 cr. (3 and 0)

Phys 505—Special Problems—3 cr. (0 and 9)

Phys 513—Thermodynamics and Statistical Mechanics—3 cr. (3 and 0)

Phys 521—Classical Mechanics I—3 cr. (3 and 0)

Phys 522—Classical Mechanics II—3 cr. (3 and 0)

Phys 541—Electrodynamics—3 cr. (3 and 0)

Phys 542—Radiation Theory—3 cr. (3 and 0)

Phys 545—Solid State I—3 cr. (3 and 0)

Phys 546—Solid State II—3 cr. (3 and 0)

Phys 551—Introduction to Quantum Mechanics—3 cr. (3 and 0)

Phys 553—Nuclear Physics I—3 cr. (3 and 0)

Phys 554—Nuclear Physics II—3 cr. (3 and 0)

Phys 555—X-ray Diffraction—3 cr. (3 and 0)
Phys 556—Crystallography—3 cr. (3 and 0)
Phys 575—Seminar in Contemporary Physics—1 or 2 or 3 cr. (1 or 2 or 3 and 0)
Phys 585—Colloquium—1 cr. (1 and 0)
Phys 591—Research—3 cr.
Phys 592—Research—3 cr.
Phys 622—Hydrodynamics—3 cr. (3 and 0)
Phys 651—Quantum Mechanics I—3 cr. (3 and 0)
Phys 652—Quantum Mechanics II—3 cr. (3 and 0)
Phys 655—Advanced Modern Physics I—3 cr. (3 and 0)
Phys 656—Advanced Modern Physics II—3 cr. (3 and 0)
Phys 666—Relativity—3 cr. (3 and 0)
Phys 691—Doctoral Research and Dissertation—Credit to be arranged

POULTRY SCIENCE
Mr. Barnett
Mr. Cooper, Mr. Stephens, Mr. Turk

PS 201—Introduction to Poultry Science—3 cr. (2 and 3)
The application of the physical and biological sciences to modern poultry production and utilization. A study of the anatomy and physiology of the fowl and the economic aspects of poultry enterprises.

PS 352—Poultry Nutrition—3 cr. (2 and 3)
Nutrient requirements of the various classes of poultry and the use of feedstuffs in meeting these needs. Prerequisite: AH 301.

PS 354—Poultry Breeding—3 cr. (2 and 3)
The application of genetics to the improvement of poultry and the effectiveness of different selection methods and mating systems. Prerequisite: Agron 302.

PS 355—Poultry Grading and Processing—3 cr. (2 and 3)
Classifying and grading of market eggs and poultry, and the preparation, packaging, processing, storage, and preservation of eggs and poultry.

PS 457—Incubation and Brooding—3 cr. (2 and 3)
Principles and practice of incubation and brooding and study of other factors related to successful operations.

PS 458—Poultry Diseases and Parasites—3 cr. (2 and 3)
Causes, occurrence, symptoms, prevention, treatment, and eradication of poultry diseases and parasites. Prerequisite: Bact 301.

PS 460—Seminar—2 cr. (2 and 0)
Current research reported in journals covering the various areas of poultry science. Prerequisite: Permission of instructor.

PS 501—Poultry Nutrition and Metabolism—3 cr. (2 and 3)

PS 502—Avian Physiology—3 cr. (2 and 3)
PS 504—Poultry Pathology—3 cr. (1 and 6)
PS 505—Seminar—1 cr. (1 and 0)
PS 591—Research—3 cr.
PS 592—Research—3 cr.

PSYCHOLOGY

Mr. Waite, Mr. Capel

Psych 301—General Psychology—3 cr. (3 and 0)
A survey of the field of psychology: development and adjustment, motivation, emotions, intelligence, personality, the sensory experiences, perception, learning, thinking, imagination and mental hygiene. Prerequisite: Junior standing.

Psych 302—Social Psychology—3 cr. (3 and 0)
A study of the interaction between the individual and the forces of society: the classical theories, the psychobiological bases of human behavior, the sociocultural bases of behavior, types of human behavior, overt and covert experiences, symbolism, personality and social interaction. Prerequisite: Psych 301.

Psych 401—Applied Psychology—3 cr. (3 and 0)
An advanced course based upon the concepts of general psychology. The material includes causation in behavior, the psychology of attitudes, morale, the basic principles of motivation and work, individual differences, psychological testing in industry, interview techniques, motion and time analysis, industrial fatigue, psychological fatigue and related phenomena, accidents and their prevention, the working environment, psychological factors in labor turnover, advertising and consumer psychology and psychology in professional life. Prerequisite: Psych 301.

Psych 402—Abnormal Psychology—3 cr. (3 and 0)
A study of mental and emotional disorders: theories of causation and problems of treatment; special phenomena of consciousness and unconsciousness, e.g., dreams, dissociation, hypnosis; analysis of pathological behavior: alcoholism, drug addiction, suicide, criminality, neurosis, and psychoneurosis. Prerequisite: Psych 301.

RELIGION

Mr. Arrington, Mr. Stockman

Rel 301—The Old Testament—3 cr. (3 and 0)
A survey of the Old Testament.

Rel 302—A Survey of New Testament Literature—3 cr. (3 and 0)
A survey of the books of the New Testament, studies as to content, literary form and purpose. Some consideration is given to the life and teachings of Jesus and the letters of Paul.

RURAL SOCIOLOGY

Mr. Aull Mr. Boyd

RS 301—Rural Sociology—3 cr. (3 and 0)
A study of human social relationships as modified by life in the country including a consideration of the farm family, its housing, health, schooling, recreational opportunities, relation to land and other similar topics.
RS 459—The Community—3 cr. (3 and 0)
The growth and development of the rural community with emphasis on organization of the community for its effective functioning in a changing society.

RS 461—Rural Leadership—3 cr. (3 and 0)
Social and psychological factors involved in rural leadership including an examination and analysis of characteristics of the successful leader, and the role of the leader in the rural community.

RS 501—Rural Social Systems—3 cr. (3 and 0)

RUSSIAN
Mr. Conis

Russ 101—Elementary Russian—3 cr. (3 and 0)
Training in pronunciation, grammatical forms, and syntax with a view of giving the student the fundamentals necessary to read simple Russian texts.

Russ 102—Elementary Russian—3 cr. (3 and 0)
A continuation of Russ 101.

Russ 201—Intermediate Russian—3 cr. (3 and 0)
The reading of simple Russian prose; a review of grammar and syntax. Drill on vocabulary and idiom. Prerequisite: Russ 101 and 102.

Russ 202—Intermediate Russian—3 cr. (3 and 0)
A continuation of Russ 201.

SOCIOLOGY
Mr. Burtner, Mr. Waite, Mr. Capel

Soc 301—Introductory Sociology—3 cr. (3 and 0)
The basic principles of sociology: culture, biological factors, the influence of geographical environment, human nature, group life, social classes, communities, social institutions and social change. Prerequisite: Junior standing.

Soc 302—Social Problems—3 cr. (3 and 0)
A survey of the major social problems, including problems of industry, education, religion, disease and public health, poverty, dependency and factors affecting social adjustment. Prerequisite: Soc 301.

Soc 402—The Family—3 cr. (3 and 0)
An inquiry into the problems of marriage and family life: the history of the family, the sociology of family life, mate selection and courtship, husband-wife relationships, parent-child interaction, divorce, and conservation of family values. Prerequisite: Senior standing.

Soc 403—Criminology—3 cr. (3 and 0)
A consideration of the major problems of crime and its treatment: causes of crime, criminal behavior, theories and practices in the treatment of criminals, and prevention of crime. Prerequisite: Soc 301.

Soc 404—Social Anthropology—3 cr. (3 and 0)
Recent and contemporary anthropology, as a social and culture-bearing animal with emphasis on the constants and variants in human behavior involved in tech-
nology, social relations, language, religion, art, and other aspects of cultures. **Prerequisite:** Soc 301.

**Soc 405—Industrial Sociology**—3 cr. (3 and 0)
A study of industry as a social organization together with the scientific examination of personality in industrial relations; the factory as a social system; problems of management; problems of labor; problems of special groups in industry; labor-management relations; and industry and the community. **Prerequisite:** 3 credits of sociology and permission of the instructor.

**Soc 406—Regional Sociology**—3 cr. (3 and 0)
An analysis and survey of American regions emphasizing facts, factors and policies pertaining to geography, population, culture, resources and waste, social institutions, and planning. **Prerequisite:** 3 credits of sociology.

**Soc 407—Sociological Theory**—3 cr. (3 and 0)
A survey of the growth of sociological theory considered from the viewpoint of the development of representative schools, their interrelationships, and convergences in mid-twentieth century theory. Required of all students presenting sociology as a secondary field of concentration. **Prerequisite:** 6 semester hours in sociology.

**Soc 408—Social Structure**—3 cr. (3 and 0)
Analysis of social structure and stratification in terms of class, status, prestige, rank, and function. Attention is given to the social role of the elite, bureaucracies, and professional and middle classes. **Prerequisite:** 6 semester hours in sociology.

**SPANISH**

*Mr. Conis, Mr. Fernandez, Mr. Mixon*

**Span 101—Elementary Spanish**—3 cr. (3 and 0)
A course for beginners in which the essentials of grammar are taught and a foundation is provided for a conversational and reading knowledge of the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

**Span 102—Elementary Spanish**—3 cr. (3 and 0)
A continuation of Span 101, with a reader. Three hours a week of classroom instruction and one hour a week in the language laboratory.

**Span 201—Intermediate Spanish**—3 cr. (3 and 0)
A review of grammar, vocabulary, and idioms; conversation, composition, and translation. Three hours a week classroom instruction and one hour a week in the language laboratory. **Prerequisite:** Span 102.

**Span 202—Intermediate Spanish**—3 cr. (3 and 0)
Introduction to Spanish literature: representative short stories, essays, novels, poetry, and plays. **Prerequisite:** Span 201. Assignments in the language laboratory.

**Span 303—Survey of Spanish Literature I**—3 cr. (3 and 0)
Literary movements, influences, and authors from the beginnings to the end of the seventeenth century. Representative works, discussions. Required of Spanish majors. **Prerequisite:** Span 201 and 202.
SPAN 304—SURVEY OF SPANISH LITERATURE II—3 cr. (3 and 0)
Literary movements, influences, and authors from the eighteenth century to the present. Required of Spanish majors. **Prerequisite:** Span 303.

SPAN 305—CONVERSATIONAL SPANISH—3 cr. (3 and 0)
Practice in spoken Spanish with emphasis on vocabulary, pronunciation, intonation, and comprehension. Some written work to increase accuracy. Required of Spanish majors. Assignments in the language laboratory. **Prerequisite:** Span 201 and 202.

SPAN 306—ADVANCED CONVERSATION AND COMPOSITION—3 cr. (3 and 0)
A continuation of Span 305 with more emphasis on written Spanish. Required of Spanish majors. **Prerequisite:** Span 305.

SPAN 401—CONTEMPORARY SPANISH LITERATURE—3 cr. (3 and 0)
Literary trends and representative authors since 1898. **Prerequisite:** Span 303 and 304.

SPAN 402—CONTEMPORARY SPANISH DRAMA—3 cr. (3 and 0)
The Spanish theater from Benavente to the present. **Prerequisite:** Span 303 and 304.

SPAN 405—NINETEENTH CENTURY SPANISH LITERATURE—3 cr. (3 and 0)
Representative authors and movements of the nineteenth century; romanti-
cism, costumbrismo, and the regional novel. **Prerequisite:** Span 303 and 304.

SPAN 406—CERVANTES AND THE GOLDEN AGE—3 cr. (3 and 0)
A study of Cervantes and the theater of the Golden Age of Spanish literature. **Prerequisite:** Span 303 and 304.

**TEXTILE CHEMISTRY AND DYEING**

Mr. Lindsay, Mr. Porter, Mr. Robbins

TC 305—TEXTILE CHEMISTRY—4 cr. (4 and 0)
For Textile Chemistry majors covering aliphatic organic compounds with major emphasis on products essential to the textile industry. **Prerequisite:** Ch 104.

TC 306—TEXTILE CHEMISTRY—4 cr. (4 and 0)
A continuation of TC 305 and 307, covering the aromatic compounds with particular attention to the chemistry of dyes and dye intermediates. **Prerequisite:** TC 305.

TC 307—TEXTILE CHEMISTRY LABORATORY—1 cr. (0 and 3)
This course is to be taken concurrently with TC 305.

TC 308—TEXTILE CHEMISTRY LABORATORY—1 cr. (0 and 3)
This course is to be taken concurrently with TC 306.

TC 321—INTRODUCTION TO TEXTILE CHEMISTRY—3 cr. (3 and 0)
The basic chemistry of the textile fibers and the reactions which are involved in the chemical processing of these fibers. The emphasis is placed on the properties and chemical behavior of such substances as cellulose, starch, resins, and detergents as well as the natural and synthetic fibers. **Prerequisite:** Ch 102.
TC 322—The Chemical Processing of Textiles—3 cr. (3 and 0)
The processes and economics involved in the preparation of fibers for use in
textiles, and of the finishing processes employed after manufacture. Included
in the topics are scouring, bleaching, mercerizing, flameproofing, stabilization,
water repellency, wrinkle recovery. Prerequisite: TC 321.

TC 323—Textile Chemistry Laboratory—1 cr. (0 and 3)
This course is to be taken concurrently with TC 321.

TC 324—Textile Chemistry Laboratory—1 cr. (0 and 3)
This course is to be taken concurrently with TC 322.

TC 421—Color Applied to Textiles—3 cr. (3 and 0)
Color, its source, its effects and its relation to chemical structure. The
processes of applying color by dyeing and printing are covered, and the com-
parative values of the various dye groups to both the textile manufacturer and
the consumer are discussed. Prerequisite: TC 321.

TC 423—Textile Chemistry Laboratory—1 cr. (0 and 3)
This course is to be taken concurrently with TC 421.

TC 440—Textile Finishing—3 cr. (1 and 6)
The principles involved in the application of finishes to textiles, with em-
phasis on the newer developments in this rapidly expanding phase of textile
chemistry. The laboratory work covers practical work in color matching as
well as the application of a wide range of finishes. Prerequisite: TC 306.

TC 442—Thesis—2 cr. (0 and 6)
An investigation by each Textile Chemistry senior of an assigned problem
related to textile processing. A formal written report is required from each
student. Prerequisite: Senior standing.

TC 447—The Chemical Processing of Textile Materials—3 cr. (3 and 0)
For Textile Chemistry majors similar to TC 421 and 423 except that it is
more comprehensive with emphasis on the problems involved in the supervision
of a textile finishing plant. Prerequisite: TC 306.

TC 449—Textile Chemistry Laboratory—1 cr. (0 and 3)
This course is to be scheduled concurrently with TC 447.

TC 456—Chemistry of Synthetic Fibers and Finishes—3 cr. (3 and 0)
The chemistry of large molecular substances such as nylon, vinyon, the
rayons, and the protein-type synthetics. The varied synthetic resins used for
special effects on textiles are covered in detail. Prerequisite: TC 306.

TC 462—The Chemical Processing of Textiles—3 cr. (3 and 0)
A continuation of TC 447 which covers textile printing and the more
complicated dyeing processes.

TC 464—The Chemical Processing of Textiles Laboratory—1 cr.
(0 and 3)
This course is to be taken concurrently with TC 462.

TC 475—Cellulose Chemistry—2 cr. (2 and 0)
The constitution and behavior of cellulose and its derivatives. Particular
attention is given to the purification of wood and other raw materials used for
the preparation of rayon pulps. Prerequisite: TC 306 and 308.
TC 511—The Theory and Application of Synthetic Resinous Materials—3 cr. (2 and 3)

TC 512—The Theory and Application of Synthetic Resinous Materials—3 cr. (2 and 3)

TC 521—Advanced Cellulose Chemistry—3 cr. (3 and 0)

TC 531—Chemistry of Coloring Matters—3 cr. (2 and 3)

TC 591—Research—3 cr.

TC 592—Research—3 cr.

TEXTILE MANAGEMENT

Mr. Campbell, Mr. LaRoche, Mr. Richardson, Mr. Wray

TM 101—Introduction to Textiles—3 cr. (2 and 3)

An introduction to textile manufacturing. Elementary studies of staple fibers, and machinery involved in converting them into yarns and fabrics.

TM 301—Textile Quality Control—3 cr. (3 and 0)

The theory underlying quality control procedures, and an introduction to these procedures with particular reference to the textile industry. The material covered includes probability, frequency, distributions, and various lot acceptance sampling plans. Prerequisite: Junior standing.

TM 302—Textile Quality Control—3 cr. (3 and 0)

A continuation of TM 301. The practical use of statistics and quality control in industry with particular reference to textiles. Control charts for variables, control charts for fraction defective, and control charts for defects per unit are presented, along with some statistics which are useful in industrial research. Prerequisite: TM 301.

TM 403—Textile Management—3 cr. (3 and 0)

Management techniques used in: Mill buildings and equipment lay-out and care; personnel management; relations with external organizations including labor unions; safety promotions; production planning and control; material, machine and labor cost control; budgeting; employment; training; standards; product sales; purchasing; quality control; textile company organization and control. Prerequisite: Senior standing or permission of instructor.

TM 405—Textile Costing—3 cr. (2 and 3)

The principles of costing as they apply to the manufacture of textiles. Allocating the cost of material, labor and overhead; determining the costs of individual yarns and fabrics; valuing the inventory; making of cost reports and payroll analysis. Prerequisite: Seniors majoring in Textiles.

TM 407—Textile Costing—3 cr. (2 and 3)

A continuation of TM 405. Prerequisite: TM 405.

TM 454—Motion and Time Study—3 cr. (2 and 3)

Job analysis; methods study; work place layout; time study and incentives; theory and practical work. Prerequisite: Senior standing or permission of instructor.
TM 460—Natural Fibers—3 cr. (3 and 0)
Fundamental properties of textile fibers as studied from the chemical, physical and botanical side. The microscopic and molecular structure development in the plant, and extraction and preparation from the plant. Survey of plant fibers and fiber plants and more complete discussion of the main natural (plant and animal) fibers. Methods of fiber research. Prerequisite: Senior standing.

TM 462—Textile Microscopy—2 cr. (1 and 3)
Especially planned to enable the student to utilize the microscope for examination and identification of textile fibers and materials used in the textile and related industries. Principal Topics: The preparation of the various materials used in the textile industry for microscopic examination. Prerequisite: Senior standing or permission of instructor.

TM 464—Physical Textile Testing—2 cr. (1 and 3)
The important machines and techniques used in physical testing of yarns and fabrics. The applications of testing in modern textile research are stressed. Prerequisite: Senior standing or permission of instructor.

TM 468—Seminar—1 cr. (1 and 0)
Visiting lecturers will be invited in to talk on things of general interest in the industry. Prerequisite: Senior standing or permission of instructor.

WEAVING AND DESIGNING
Mr. McKenna
Mr. Cartee, Mr. Hubbard, Mr. Tarrant, Mr. Walters, Mr. Williams

WD 221—Fabric Design—3 cr. (2 and 3)
To give a practical working knowledge of the weaves used in fabricating many elementary and some complex woven fabrics. It is a continuation of the design work given in TM 101 and will include the derivatives of the foundation weave and the more complex weaves used in special and compound fabrics. Prerequisite: TM 101.

WD 225—Loom Mechanisms—2 cr. (1 and 3)
To give theoretical and practical working knowledge of the construction, mechanical operation, and adjustments of the cam loom.

WD 226—Loom Mechanisms—2 cr. (1 and 3)
A continuation of WD 225 and will include studies of the construction, mechanical operation, and adjustment of the dobby, box, and jacquard mechanisms. Prerequisite: WD 225.

WD 301—Fabric Structure and Design—2 cr. (1 and 3)
The plans, drafts and specifications required for the production of plain, leno, and figured fabrics. Leno mechanisms and design; warp and filling layouts; weave combinations; fabric construction; ratio of intersections; harness, reed and chain plans; warping and slashing plans. Prerequisite: WD 221.

WD 302—Fabric Analysis—2 cr. (1 and 3)
The analysis of fabrics as they come to the mill for reproduction. Methods of determining yards per pound from a small sample and from the yarn counts; over-all and ground construction; selection of yarn counts; determining the
design, drawing-in-draft, chain draft and reed plan; warp dressing plan; cotton, wool, silk and rayon fabrics. Prerequisite: WD 221.

WD 309—Knitting—1 cr. (0 and 3)
The principles of knitted fabric construction and hosiery production. Knitting mechanisms, construction of knitted fabrics and hosiery, rib knitting, hosiery machinery, fancy knitting and knitting calculations.

WD 401—Warp Preparation—2 cr. (1 and 3)
Warping and slashing mechanisms and the plans and requirements for efficient operation. Types of warping equipment; slashing machinery; size mixtures and processing methods for cotton, rayon and other fibers. Prerequisite: WD 301.

WD 402—Fabric Development—3 cr. (2 and 3)
Production of woven patterns as studied in fundamental courses in the Weaving and Designing Department. Fabric development, analysis and cloth order problems. Prerequisite: WD 226, 301, 302.

WD 403—Advanced Designing—3 cr. (2 and 3)
A continuation of WD 221 covering the more complex weaves for double cloths, pile fabrics, and jacquard effects. Prerequisite: WD 221 and WD 226.

YARN MANUFACTURING

Mr. Efland
Mr. Thomson, Mr. Marvin, Mr. Wilson

YM 221—Opening and Blending—3 cr. (2 and 3)
The necessity for blending, opening and preliminary cleaning and the equipment for doing this on cotton and man-made fibers. Waste and other calculations, measuring devices and evener motions. Basic cotton classing.

YM 222—Cleaning—3 cr. (2 and 3)
Cleaning and processing as done by the card and comber. Settings and speeds. Calculations for draft production and waste. Job distribution and work loads. Theory of fiber separation. Prerequisite: YM 221 or permission of the instructor.

YM 301—Roving Frames—3 cr. (2 and 3)
The construction and operation of fly frames. Drafting, twisting and winding on slubbers, intermediates, and Jack frames; production, rolls, spindles and flyers, differential motions and cones, twist per inch; all calculations for these topics.

YM 321—Drafting, Twisting and Winding I—3 cr. (2 and 3)
Roller drafting as done by the drawing frame and roving frame. Rollsettings and drafting systems. Twisting and winding as done on the roving frame. Calculations applying to drawing frames and roving frames. Job distribution and work loads. Prerequisite: YM 222 or permission of the instructor.

YM 322—Drafting, Twisting and Winding II—3 cr. (2 and 3)
The manufacturing possibilities of the ring spinning frame and ring twister as they are used in the processing of staple fibers. The theory of the spindle, ring and traveler, drafts, twist, builder motions, production, general machine construction, and problems applicable to machines. Job distribution and work loads. Prerequisite: YM 321 or permission of the instructor.
YM 401—Yarn Manufacturing Problems—3 cr. (2 and 3)
A thesis type course of planning, record keeping and writing a report on a yarn manufacturing problem. Problem will include processing. Prerequisite: Senior standing.

ZOOLOGY
Mr. Cochran
Mr. Reed, Mr. Anderson, Mr. King, Mr. Ware, Mr. Webb, Mr. Adkins, Mr. Buxton, Mr. Tombes, Mrs. Crosby

Zool 101, 103—General Zoology—4 cr. (3 and 3)
Thorough training in fundamental animal types and zoological principles. The morphology, physiology, behavior, reproduction, ecology, embryology, zoogeography, evolution and palaeontology of each phylum are presented.

Zool 301—Comparative Vertebrate Anatomy—3 cr. (2 and 3)
Advanced training in zoological principles, physiology and comparative vertebrate anatomy. Prerequisite: Zool 101, 103.

Zool 302—Vertebrate Embryology—3 cr. (2 and 3)
Fundamentals of developmental anatomy of the organ systems as illustrated by the chick and pig. Students prepare histological sections and mounts to acquire practice in laboratory procedures and knowledge of vertebrate microscopic anatomy. Identification of the various tissues is stressed. Prerequisite: Zool 101, 103 and 301 or permission of the instructor.

Zool 304—Animal Ecology—2 cr. (1 and 3)
Marine, fresh water and land animal communities as they exist in South Carolina. Students will gain a knowledge of the common animal associations as they are related to land use through lectures, reading, films and field trips.

Zool 306—Game Management—2 cr. (2 and 0)
Breeding habits of game animals and birds and type of territory desirable. The ethics of sportsmanship and the control of predators are among other subjects covered.

Zool 307—Animal Anatomy and Physiology—3 cr. (2 and 3)
Anatomy, and physiological processes of ingestion, secretion, excretion, respiration, circulation, reproduction and metabolism of warm-blooded animals. This course is designed for students majoring in Pre-Medicine, Pre-Veterinary, Animal Husbandry, Dairy and Poultry. Prerequisite: Zool 101, 103.

Zool 308—Applied Zoology—2 cr. (2 and 0)
The fundamental principles of zoology are presented along with a brief description of the important phyla of animals. The management and control of animals of economic importance excluding domestic animals and the nature of animal diseases is included. This is a terminal course designed for engineering students who do not plan further work in the field. Prerequisite: Bot 101.

Zool 312—Wildlife Management—3 cr. (2 and 3)
Basic principles and general practices of Wildlife Management and Conservation will be covered. This course deals with the major problems concerning the management of Wildlife Resources, with emphasis on upland game species. The laboratory work includes practical work on the Clemson College Woodlands and field trips to several areas where wildlife management is being practiced.
Zool 403—Protozoology—3 cr. (2 and 3)
Taxonomy of the sub-kingdom protozoa with special reference to the parasitic forms directly affecting man. Representative types of free-living forms are surveyed with emphasis on their morphology, physiology and distribution. Prerequisite: Zool 101, 103.

Zool 404—Animal Pathology—3 cr. (2 and 3)
A course designed to inform students in the causes, treatments, and prevention of animal diseases. Those transmissible to man are considered in detail. Emphasis is placed on hygiene and care of the sick.

Zool 405—Animal Histology—3 cr. (2 and 3)
Microscopic structures of tissues and organs of the animal body. This course is for students in Pre-Veterinary, Pre-Medicine and the Animal Science courses. Prerequisite: Zool 101, 103.

Zool 456—Parasitology—3 cr. (2 and 3)
Parasites affecting man and domestic animals. Life cycles, vectors and practical controls are emphasized.

Zool 458—Cell Physiology—3 cr. (2 and 3)
An introduction to the fundamental processes of physiology as exemplified by the cell. Dynamic cellular environment, irritability and response, metabolism, respiration and growth and differentiation will be studied. Prerequisite: Zool 101, 103, Organic Chemistry.

Zool 501—Animal Histology—3 cr. (2 and 3)
Zool 502—Histological Techniques—3 cr. (1 and 6)
Zool 503—Animal Ecology—4 cr. (2 and 6)
Zool 504—Ornithology—3 cr. (2 and 3)
Zool 505—Animal Pathology—3 cr. (3 and 0)
Zool 511—Recent Advances in Zoology and Entomology I—1 cr. (1 and 0)
Zool 512—Recent Advances in Zoology and Entomology II—1 cr. (1 and 0)
Zool 513—Evolution—3 cr. (3 and 0)
Zool 552—Principles and Methods of Systematic Zoology—2 cr. (2 and 0)
Zool 556—Economic Zoology—3 cr. (2 and 3)
Zool 591—Research—3 cr.
Zool 592—Research—3 cr.
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                                      Agricultural Engineer

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† Research staff.
‡ Extension staff.
§ On leave.
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Agronomy and Soils

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Animal Husbandry

R. F. Wheeler, Ph.D.°† Head of Department, Professor of Animal Husbandry, Animal Husbandman
J. R. Ables, M.S.‡ Assistant Animal Husbandman, Edisto Station
C. W. Ackerman, M.S.‡ Extension Livestock Specialist
R. D. Bell, B.S.‡ Animal Husbandry Assistant
L. F. Cato, M.S.† Extension Livestock Specialist

* Teaching staff.
† Research staff.
‡ Extension staff.
## School of Agriculture Staff

### Botany, Bacteriology, and Plant Pathology

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>W. M. Epps, Ph.D.</td>
<td>Head of Department, Professor of Botany and Bacteriology, Plant Pathologist and State Plant Pathologist</td>
</tr>
<tr>
<td>W. B. Albert, Ph.D.</td>
<td>Associate Plant Physiologist</td>
</tr>
<tr>
<td>P. M. Alexander, Ph.D.</td>
<td>Assistant Plant Pathologist</td>
</tr>
<tr>
<td>R. P. Ashworth, Ph.D.</td>
<td>Associate Professor of Botany</td>
</tr>
<tr>
<td>E. G. Beinhart, Jr., Ph.D.</td>
<td>Plant Physiologist (USDA)</td>
</tr>
<tr>
<td>J. H. Bond, M.S.</td>
<td>Associate Professor of Bacteriology</td>
</tr>
<tr>
<td>D. F. Cohoon, Ph.D.</td>
<td>Superintendent and Associate Plant Pathologist, Edisto Station</td>
</tr>
<tr>
<td>W. M. Dowler, Ph.D.</td>
<td>Plant Pathologist (USDA)</td>
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<tr>
<td>H. H. Foster, Ph.D.</td>
<td>Associate Professor of Botany</td>
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<tr>
<td>T. W. Graham, Ph.D.</td>
<td>Plant Pathologist, Pee Dee Station (USDA)</td>
</tr>
<tr>
<td>J. E. Halpin, Ph.D.</td>
<td>Associate Professor of Botany</td>
</tr>
<tr>
<td>G. C. Kingsland, Ph.D.</td>
<td>Assistant Professor of Botany, Assistant Plant Pathologist</td>
</tr>
<tr>
<td>M. W. McCarter, Jr., M.S.</td>
<td>Assistant Plant Pathologist, Truck Station</td>
</tr>
<tr>
<td>A. C. Mathews, Ph.D.</td>
<td>Professor of Botany</td>
</tr>
<tr>
<td>W. C. Nettles, M.S.</td>
<td>Leader, Extension Entomology and Plant Disease Work</td>
</tr>
<tr>
<td>D. H. Petersen, Ph.D.</td>
<td>Plant Pathologist (USDA)</td>
</tr>
<tr>
<td>J. M. Rush, Ph.D.</td>
<td>Professor of Bacteriology</td>
</tr>
<tr>
<td>R. W. Rutledge, Ph.D.</td>
<td>Professor of Botany</td>
</tr>
<tr>
<td>W. R. Sitterly, Ph.D.</td>
<td>Associate Plant Pathologist, Truck Station</td>
</tr>
<tr>
<td>F. H. Smith, M.S.</td>
<td>Extension Plant Pathologist</td>
</tr>
<tr>
<td>J. B. Whitney, Jr., Ph.D.</td>
<td>Associate Professor of Botany, Associate Forest Pathologist</td>
</tr>
</tbody>
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### Community and Public Affairs

<table>
<thead>
<tr>
<th>Name</th>
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<tr>
<td>O. W. Lloyd, M.S.</td>
<td>Rural Development Specialist</td>
</tr>
</tbody>
</table>

### Crop Pest Commission

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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>J. H. Cochran, Ph.D.</td>
<td>State Entomologist, Entomologist, Professor of Entomology and Zoology</td>
</tr>
<tr>
<td>W. M. Epps, Ph.D.</td>
<td>State Plant Pathologist, Plant Entomologist, Professor of Botany and Bacteriology</td>
</tr>
</tbody>
</table>

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*Teaching staff.
† Research staff.
‡ Extension staff.
§ Part time.
¶ On leave.
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E. J. Lease, Ph.D.† Nutritionist
W. C. Mickelberry, Ph.D.† Assistant Food Technologist
A. L. Shewfelt, Ph.D.°† Associate Professor of Food Technology, Associate Food Technologist
H. O. Wheeler, Ph.D.† Assistant Nutritionist

Forestry
Koloman Lehotsky, Ph.D.°† Head of Department, Professor of Forestry, Forester
W. J. Barker, B.S.† Leader, Forestry Extension Work
M. H. Bruner, M.F.°† Associate Professor of Forestry, Forester
B. M. Cool, Ph.D.°† Associate Professor of Forestry, Associate Forester
N. B. Goebel, M.S.† Associate Forester
C. W. Hall, B.S.† Extension Forester, Columbia
C. L. Lane, B.S.°† Assistant Professor of Forestry, Assistant Forester
W. H. D. McGregor, Ph.D.°† Associate Professor of Forestry, Associate Forester
S. A. Marbut, B.S.† Extension Forester
W. C. Randel, M.S.°† Associate Professor of Forestry, Associate Forester

* Teaching staff.
† Research staff.
‡ Extension staff.
L. D. Reamer, B.S.† .................................. Assistant Forester
W. A. Shain, M.F.°† .................................. Assistant Professor of Forestry, Assistant Forester
A. T. Shearin, B.S.† .................................. Assistant Forester
R. D. Shipman, Ph.D.°† .................................. Associate Professor of Forestry, Associate Forester
J. R. Warner, D.F.°† .................................. Associate Professor of Forestry, Associate Forester

Four-H Club Work
J. B. Williams, B.S.‡ .................................. State 4-H Club Agent
G. H. Baker, B.S.‡ .................................. District Boys’ 4-H Club Agent, Florence
Waymon Johnson, M.S.‡ .................................. Assistant Boys’ 4-H Club Agent, State College, Orangeburg
Altamese B. Pough, B.S.‡ .................................. Assistant Girls’ 4-H Club Agent, State College, Orangeburg
Margaret Richter, M.S.‡ .................................. Assistant State Girls’ 4-H Club Agent
J. T. Rogers, B.S.‡ .................................. State Boys’ 4-H Club Agent
Georgia M. Taylor, M.Ed.‡ .................................. State Girls’ 4-H Club Agent

Home Demonstration
Lucille D. Chandler, B.S.‡ .................................. Extension House Furnishings Specialist
Ellie Herrick, B.S.‡ .................................. Extension Family Life Specialist
Betty J. Moore, M.S.‡ .................................. Extension Nutritionist
Frances H. Odom, M.A.† .................................. Extension Housing and Food Preservation Specialist
Elizabeth W. Potter, M.A.† .................................. Extension Home Management Specialist
Vela M. Smith, M.S.‡ .................................. Extension Clothing Specialist
Betty P. Watkins, M.S.‡ .................................. Extension Consumer Information Specialist, Columbia

Horticulture
T. L. Senn, Ph.D.°† .................................. Head of Department, Horticulturist and Professor of Horticulture
W. C. Barnes, Ph.D.† .................................. Superintendent and Horticulturist, Truck Station
H. A. Bowers, M.S.† .................................. Extension Truck Crops Specialist, Barnwell
Guy L. Buckner † .................................. Horticultural Assistant, Truck Station
Henry Clay, Jr., B.S.‡ .................................. Extension Horticulturist
J. H. Crawford, M.S.‡ .................................. Assistant Horticulturist
R. J. Ferree, M.S.‡ .................................. Leader, Extension Horticulture Work
J. P. Fulmer, M.S.°† .................................. Assistant Horticulturist, Assistant Professor of Horticulture
C. E. Gambrell, Jr., M.S.† .................................. Assistant Horticulturist, Sandhill Station
M. G. Hamilton, Ph.D.† .................................. Associate Horticulturist, Edisto Station
M. B. Hughes, Ph.D.† .................................. Horticulturist, Edisto Station
J. A. Martin, B.S.† .................................. Associate Horticulturist
W. L. Ogle, Ph.D.°† .................................. Associate Horticulturist, Associate Professor of Horticulture
H. J. Sefick, M.S.°† .................................. Associate Horticulturist, Associate Professor of Horticulture
E. T. Sims, Jr., Ph.D.°† .................................. Assistant Professor of Horticulture, Assistant Horticulturist
B. J. Skelton, M.S.°† .................................. Instructor in Horticulture and Research Assistant
P. M. Smith, M.S.‡ .................................. Extension Horticulturist
G. E. Stembridge, Ph.D.°‡§ .................................. Assistant Professor of Horticulture, Assistant Horticulturist
F. W. Thode, M.S.° .................................. Associate Professor of Horticulture
L. O. Van Blaricom, M.S., Ch.E.°† .................................. Horticulturist, Professor of Horticulture

Marketing (Headquarters, Columbia)
J. E. Youngblood, B.S.† .................................. Chief, Extension Division Marketing
D. C. Hutchins, B.S.† .................................. Extension Marketing Specialist
C. H. Langford, B.S.† .................................. Extension Marketing Specialist

* Teaching staff.
† Research staff.
‡ Extension staff.
§ On leave.
E. W. Siedschlag, B.S.† ................................ Extension Marketing Specialist
R. D. Steer, B.S.† ................................ Extension Cooperative Marketing Specialist, Greenwood
W. A. Tuten † .................................................. Extension Marketing Specialist

Poultry Science
B. D. Barnett, Ph.D.°† ........................................ Head of Department, Professor of Poultry Science, Poultry Scientist
B. W. Bierer, V.M.D.† ....................................... Poultry Scientist, Laboratory Director, Columbia
M. A. Boone, Ph.D.† ......................................... Associate Poultry Scientist
J. B. Cooper, M.S.°† .......................................... Associate Professor of Poultry Science, Associate Poultry Scientist
P. H. Gooding, M.S.† ......................................... Leader, Poultry Extension Work
C. F. Risher, B.S.† ........................................... Extension Turkey Specialist, York
J. F. Stephens, M.S.°† ........................................ Assistant Professor of Poultry Science, Assistant Poultry Scientist
T. C. Stewart, Sr., B.S.† ...................................... Extension Poultryman
K. L. Swiney, B.S.† ........................................... Assistant Extension Poultryman
D. E. Turk, Ph.D.°† ........................................... Assistant Professor of Poultry Science, Assistant Poultry Scientist
J. F. Welter, B.S.† ............................................. Poultry Science Assistant

Seed Certification
R. H. Garrison, B.S.† ........................................ Head of Department, Associate Plant Breeder
E. M. Huggins, M.S.† ......................................... Assistant Agronomist

° Teaching staff.
† Research staff.
† Extension staff.

COUNTY AGENTS

County Name Post Office
Abbeville L. H. Bull, B.S. Abbeville
Aiken J. H. Evans, B.S. Aiken
Allendale W. H. Funchess, M.S. Allendale
Anderson H. D. Marett, B.S. Anderson
Bamberg G. H. Liebenrood, M.S. Bamberg
Barnwell J. B. Griffith, B.S. Barnwell
Beaufort W. L. Johnson, M.S. Beaufort
Berkeley M. C. Mason, B.S. Moncks Corner
Calhoun O. W. Cain, B.S. St. Matthews
Charleston C. J. Livingston, B.S. Charleston
Cherokee T. B. Lee, B.S. Gaffney
Chester D. C. Wylie, Jr., B.S. Chester
Chesterfield J. C. Willis, B.S. Chesterfield
Clarendon A. D. Grainger, B.S. Manning
Colleton L. W. Alford, B.S. Walterboro
Darlington W. J. Gray, B.S. Darlington
Dillon D. A. Benton, B.S. Dillon
Dorchester D. E. Epps, B.S. St. George
Edgefield J. W. Gilliam, Jr., B.S. Edgefield
Fairfield M. H. Lynn, B.S. Winnsboro
Florence H. F. Livingston, Jr., B.S. Florence
Georgetown A. E. Liebenrood, B.S. Georgetown
Greenville J. K. Jones, B.S. Greenville
Greenwood P. M. Garvin, B.S. Greenwood
Hampton C. W. Thompson, M.S. Hampton
Horry V. M. Johnston, B.S. Conway
Jasper E. G. Tate, Jr., B.S. Ridgeland
Kershaw W. C. McCarley, B.S. Camden
Lancaster F. W. Cannon, B.S. Lancaster
Laurens Marett Outz, B.S. Laurens
Lee V. F. Linder, B.S. Bishopville
## Public Service Activities

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### ASSOCIATE AND ASSISTANT COUNTY AGENTS

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### COUNTY HOME DEMONSTRATION AGENTS

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ASSOCIATE AND ASSISTANT HOME DEMONSTRATION AGENTS

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<th>County</th>
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<td>Lonieal L. Harrison, B.S.</td>
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EXTENSION SERVICE EMERITI

Caroline Simonont Alston ............................... Home Demonstration Agent Emeritus
John Chipley Anthony, B.A. ................................... County Agent Emeritus
Delphena Wilkerson Arnold, L.I., Asso. Home Demonstration Agent Emeritus
Ophelia Sue Barker, B.S. .............................. Home Demonstration Agent Emeritus
Benjamin Barnwell ........................................ Associate County Agent Emeritus
Elizabeth DuBose Boykin, A.B. .......................... Home Demonstration Agent Emeritus
Harry Gilmore Boylston, B.S., Extension Cotton Improvement Specialist Emeritus
Lillian Watts Brown, L.I. ................................. Associate Home Demonstration Agent Emeritus
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Claude William Carraway, B.S. ........................... County Agent Emeritus
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Matti Lee Cooley, B.S. ...................................... Home Demonstration Agent Emeritus
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George Washington Daniels, L.I. ....................... Associate County Agent Emeritus
James Ervin Dickson, B.S. ................................ Associate County Agent Emeritus
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Louise Fleming, A.B. ......................................... Home Demonstration Agent Emeritus
Rosa Gibbs Gadson, L.I. ................................... Associate Home Demonstration Agent Emeritus
Minnie Estha Gandy ......................................... Associate Home Demonstration Agent Emeritus
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Mary Catherine Haynie, B.A. ............................. Home Demonstration Agent Emeritus
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Mamie Sue Hicks, B.S. ..................................... Home Demonstration Agent Emeritus
Jesse Howard Hopkins, Sr., B.S. ......................... County Agent Emeritus
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Elizabeth McNab, A.B. .................................... Home Demonstration Agent Emeritus
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Izora Miley ....................................................... Home Demonstration Agent Emeritus
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Marian Baxter Paul, B.S. .................................. Assistant in Home Economics Extension Emeritus
Theodosia Dargan .............................................. District Agent Emeritus
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Mahala Jane Smith, B.S. .................................... Home Demonstration Agent Emeritus
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Livestock-Poultry Health Department

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William Thompson, B.S. ........................................... Associate County Agent Emeritus
Ernest Craig Turner, B.S. ........................................... Extension Conservationist Emeritus
Larkin Vandiville Walker, B.S. .................................... Associate County Agent Emeritus
Audley Hoffman Ward, B.S., M.S. ............................... District Agent Emeritus
David Wayne Watkins, B.S., M.A. ................................. Director Emeritus

LIVESTOCK-POULTRY HEALTH DEPARTMENT
P. O. Box 1771
COLUMBIA, SOUTH CAROLINA

Director and State Veterinarian
R. W. Carter, D.V.M. .................................................. Columbia

State Assistant Director
C. L. Vickers, D.V.M. ................................................. Columbia

Federal Assistant Director
Ross W. Gerding, B.Sc., D.V.M. .................................... Columbia

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O. E. Baker, D.V.M. ................................................... Columbia
Bert W. Bierer, V.M.D. ............................................... Columbia
Walter T. Carll, D.V.M. .............................................. Columbia
W. R. Chastain, D.V.M. ............................................... Columbia
Charles E. Graddick, D.V.M. ....................................... Greenwood
S. L. Moore, D.V.M. .................................................. Clemson
H. S. Powell, D.V.M. .................................................. Columbia
Doyle E. Roebuck, Ph.D. ............................................ Columbia
Jack Scott, D.V.M. .................................................... Hemingway
John B. Thomas, D.V.M. ............................................ Columbia

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Jack C. Fortner .......................................................... Columbia
Peggy L. Kelly ............................................................. Columbia
Furman Peake ............................................................ Columbia
Willard Robinson ....................................................... Columbia

State Livestock Law Enforcement Officers
James C. Epps, Jr., B.Sc. ............................................ Columbia
Charles L. Fleming, B.Sc. ........................................... Columbia
Charles E. Grant, B.Sc. ............................................. Columbia

State Livestock Quarantine Officers
J. H. Cope, B.Sc. ....................................................... Cope
Laurie D. Morris ....................................................... Hemingway

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Jake P. Ginn, Jr., B.Sc. ............................................. Varnville
DeWitt W. Maxey ...................................................... Spartanburg
P. M. Snowden .......................................................... Hemingway

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Mary F. Brown .......................................................... Columbia
Wilma M. Campbell .................................................. Columbia
Chester B. Collins .................................................... Columbia
Carolyn W. Jacobs ................................................... Columbia
J. B. Klugh ............................................................... Columbia
I. Lee Motley ............................................................. Columbia
Roberta M. Rose ....................................................... Columbia
C. M. Steele, Sr. ......................................................... Columbia
Public Service Activities

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M. L. Gunnels, Jr., D.V.M. ........................................ Walterboro
Wm. S. Jackson, D.V.M. ........................................... Orangeburg
H. A. Jordon, D.V.M. ............................................. Timmonsville
J. M. Love, D.V.M. ................................................ Chester
Herbert Racoff, D.V.M., M.S. .................................... Columbia
K. N. Wiser, D.V.M. .............................................. Greer

Federal Laboratory Assistants

Evelyn M. Goff ....................................................... Columbia
Wayne Lovette ...................................................... Columbia

Federal Livestock Inspectors

James W. Crowder, Jr. ............................................ Rock Hill
Thomas R. Davis .................................................. Clinton
Julian L. Morris ................................................... Lake City
Bernard B. Oswald ............................................... Lexington
James A. Ritter, Jr. .............................................. Walterboro
John G. Smith, B.Sc. ............................................. Orangeburg
Roy D. Wingard, B.Sc. ............................................ Columbia

Federal Clerical

Betty D. Brown ...................................................... Columbia
Ida B. Strickland .................................................. Columbia
Elizabeth T. Webster, A.B. .................................... Columbia
Maude E. West ..................................................... Columbia

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Henry M. Anderson, D.V.M. ..................................... Florence
R. E. Atkinson, D.V.M. ........................................... Kingstree
N. J. Ayers, D.V.M. ................................................ Greer
O. E. Ballenger, D.V.M. ......................................... Easley
W. R. Beasley, D.V.M. .......................................... Batesburg
R. V. Beaty, Jr., D.V.M. ......................................... Sumter
M. R. Blackstock, D.V.M. ....................................... Spartanburg
James E. Brehm, D.V.M. ........................................ Surfside
Wayne Brooks, D.V.M. ........................................... Taylors
David L. Brown, Jr., D.V.M. .................................. Florence
T. E. Brown, D.V.M. ............................................... Spartanburg
J. E. Burch, D.V.M. ................................................ Lake City
Stuart E. Burnett, D.V.M. ....................................... Sumter
T. L. Burriss, D.V.M. ............................................. Anderson
W. M. Burriss, D.V.M. ........................................... Anderson
W. S. Carr, D.V.M. ................................................ Aiken
F. P. Caughman, B.Sc., D.V.M. ................................. Columbia
F. P. Caughman, Jr., D.V.M. ..................................... Columbia
G. W. Cofer, D.V.M. .............................................. Columbia
C. W. Colquitt, D.V.M. .......................................... Barnwell
I. R. Cooper, Sr., D.V.M. ....................................... Allendale
W. C. Cottingham, D.V.M. ...................................... Trio
Jack R. Cox, D.V.M. ............................................. Myrtle Beach
M. D. Culpepper, D.V.M. ........................................ Chester
J. N. Dalton, D.V.M. ............................................. Bamberg
J. W. Dantzler, D.V.M. ........................................... Orangeburg
J. T. Dickson, D.V.M. ........................................... Rock Hill
C. M. Dotson, D.V.M. ............................................. Lancaster
F. E. Ducey, Jr., D.V.M. ......................................... Ridgeland
Will T. Dunn, D.V.M. ............................................ Greenvill
H. P. Dyches, D.V.M. ............................................ Aiken
James A. Eidson, Jr., D.V.M. ................................. Florence
Thomas H. Eleazer, D.V.M. .................................................. Kingstree
Wm. S. Fairey, D.V.M. ...................................................... Orangeburg
J. C. Frazier, D.V.M. ...................................................... Greenville
H. L. Frieze, D.V.M. ...................................................... Gaffney
T. F. Fussell, D.V.M. ...................................................... Spartanburg
S. P. Galphin, D.V.M. ...................................................... Holly Hill
J. G. Gibson, D.V.M. ...................................................... Florence
W. H. Giddens, D.V.M. .................................................... Saluda
W. H. Gilmore, D.V.M. ................................................... Columbia
D. E. Goodman, D.V.M. .................................................. Turbeville
G. J. Grissam, D.V.M. ...................................................... Gaffney
L. H. Hardy, D.V.M. ...................................................... Camden
C. C. Harmon, D.V.M. .................................................... Columbia
J. W. Hawk, D.V.M. ......................................................... North Augusta
Carlos Helms, D.V.M. ..................................................... Crescent Beach
Wm. S. Hicks, D.V.M. ...................................................... Columbia
W. G. Hill, D.V.M. ........................................................ Abbeville
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E. G. Horres, D.V.M. ...................................................... Charleston
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Earl A. McDowell, D.V.M. ............................................. Greenville
Carl D. McElveen, D.V.M. ............................................... Columbia
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B. C. McLean, V.M.D. ..................................................... Aiken
S. R. McMaster, D.V.M. ............................................... Rock Hill
F. A. McWilliams, D.V.M. .............................................. Greenville
E. E. Nissen, D.V.M. ...................................................... Marion
D. E. Orr, D.V.M. .......................................................... Clinton
A. B. Pittman, D.V.M. .................................................... Springfield
Neil D. Porter, D.V.M. .................................................. West Columbia
Bruce G. Pratt, D.V.M. .................................................. Beaufort
Petro Pshyk, D.V.M. ...................................................... Summerville
G. D. Radford, D.V.M. ................................................... Beaufort
Public Service Activities

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<td>R. E. Wright, D.V.M.</td>
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<td>L. E. Young, D.V.M.</td>
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Technical Livestock Committee

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<tr>
<td>R. W. Carter, D.V.M., Chairman</td>
<td>Box 1771, Columbia</td>
</tr>
<tr>
<td>W. L. Abernathy</td>
<td>Box 5, Chester</td>
</tr>
<tr>
<td>O. A. Argoe</td>
<td>Charleston Highway, Orangeburg</td>
</tr>
<tr>
<td>Dan Hutto</td>
<td>Holly Hill</td>
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<td>Ellis Monroe</td>
<td>Moore</td>
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<td>T. C. Moss</td>
<td>Cameron</td>
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<tr>
<td>W. C. Smith</td>
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THE SOUTH CAROLINA AGRICULTURAL EXPERIMENT STATION

With a nucleus of research planning at Clemson, the South Carolina Agricultural Experiment Station has 16 departments and 2 special units located here. Each department conducts specialized research in its own field, and its findings are made known to the public through special publications and news releases. Six branch experiment stations operate as separate units in different sections of the State, under the direction and organization of the Clemson Station.
More effective agricultural production and marketing through research is the goal of the Station. The farmer’s work can be made easier, cheaper, and more profitable by research to learn what effect current farmer practice has on the financial return he gets. Newer methods not yet put into use by farmers are also studied with appropriate release of findings.

Opportunity to work and gain experience is offered to a limited number of students by some departments where research is conducted. Laboratories are open to inspection by students, farmers, and others. The public is invited to write to the Station Director to request information about any specific problem encountered in agriculture. A full report of work and expenditures of the S. C. Agricultural Experiment Station is published annually and may be obtained free of charge. Other publications of the Station are also free and will be sent upon request.

Research at the Station embraces problems peculiar to the Southeast as well as to the State, and results receive nationwide publication through USDA releases. The Station’s work is financed by State appropriation, Federal appropriation, grants from commercial companies and foundations, and returns from products grown for research.

FERTILIZER INSPECTION AND ANALYSIS

The Fertilizer Inspection and Analysis Department is charged with the enforcement of the South Carolina Fertilizer Law. In addition to procuring official samples for analysis to see that the guarantees are met, the department inspects for proper bag printing and weights of fertilizers. It also makes analyses of insecticides, unexploited sources of water, minerals, and parts of human bodies when poisons are suspected as the cause of death. The 10 part-time fertilizer inspectors are also deputized as insecticide inspectors. This arrangement is satisfactory, and it not only represents a considerable saving to Clemson College but it also more efficiently serves the dealers and farmers. A large number of fertilizer dealers are also insecticide dealers.

Approximately 6,000 fertilizer samples are procured annually. Usually, five to six per cent of these samples are deficient in analysis, which necessitates the manufacturers making penalty refunds to the ultimate users from $16,000 to $18,000 annually. Farmers are normally refunded 30 to 40 tons of fertilizer on account of short weights. Specific figures are available on all refunds in the Annual Bulletins. The department also procures and analyzes between 1,500 to 2,000 insecticide samples annually.
THE CLEMSON COLLEGE EXTENSION SERVICE

The Clemson College Extension Service is a branch of Clemson College and is a cooperative service supported by the counties, the State, and the Federal government. The Extension Service is responsible for conducting with all people of South Carolina the cooperative educational and demonstration programs in agriculture and home economics of Clemson College and the United States Department of Agriculture.

The function of the Extension Service is to make available to farmers, homemakers, and rural boys and girls, through on-the-farm service, demonstrations, meetings, newspaper articles, publications, radio and television broadcasts, and other suitable methods, the results of research and successful farm and home experience. It also assists, through interpretation, practical demonstrations and otherwise, in applying and using this information to improve their farms, farm homes, and communities, to the end that they may build a safe, sound, and progressive rural life and agriculture.

The annual plan of agricultural and home economics extension work is developed and carried out with close cooperation between the Extension Service and the farm and home leadership of the State, the counties, and the rural communities and neighborhoods.

The Staff of Agricultural Extension Workers includes the director, an associate director, 4 district supervisory agents, an administrative assistant, an assistant in farm and home development, 46 county agents—one in each county, 38 associate county agents, 69 assistant county agents, and 51 agricultural specialists in agricultural economics, agricultural engineering, agronomy, boys' 4-H club work, dairying, crop insects and diseases, cotton ginning, forestry, horticulture, livestock, marketing, poultry and turkeys, publications, rural development, soil conservation, and visual instruction.

The Extension Home Demonstration Staff includes a state home demonstration agent, 4 associate district supervisory agents, 46 county home demonstration agents—one in each county, 12 associate home demonstration agents, 52 assistant home demonstration agents, and 10 specialists in clothing, family life, food production and conservation, girls' 4-H club work, home management, marketing, and nutrition.

LIVESTOCK-POULTRY HEALTH DEPARTMENT

The Clemson College Livestock-Poultry Health Department is consolidated under one Director with the United States Department of Agriculture, Agricultural Research Service, Animal Disease
Eradication Division, and is known as the State-Federal Livestock Disease Eradication Program. This department is charged with the control and eradication of contagious, infectious and communicable diseases of livestock and poultry and with the intra-state and inter-state movement of livestock and poultry. When requested, investigations are made, consultations are held, and assistance in diagnosis is rendered. This department further organizes, develops, and carries on educational programs for the control and eradication of diseases. Quarantine measures are employed to prevent, as far as possible, the introduction or spread of livestock diseases into this state.

The Clemson Livestock Laboratory, a fully equipped modern laboratory, staffed with highly trained personnel, is maintained 14 miles northeast of Columbia on U. S. Highway No. 1, at the site of the Sandhill Experiment Station. This laboratory is prepared to assist veterinarians and owners of livestock and poultry in making post-mortem laboratory examinations and bacteriological and pathological studies to aid in the diagnosis of diseases. If necessary, sufficient equipment can be sent into the field to diagnose and control disease on the spot.

The administrative office is located in the above building. Adequate records and identification of livestock are kept. A staff of veterinarians works from the Columbia office, and field veterinarians are located in various sections of the State. In addition to the regular field force of veterinarians directly connected with the Columbia office, practicing veterinarians are commissioned as State-Federal Accredited Veterinarians and assist in the eradication of infectious diseases of livestock. At present there are 133 veterinarians so commissioned and their locations are such that the Clemson College Livestock-Poultry Health Department is in a position to control and eradicate disease promptly and completely in all sections of the State.

This department is required by legislative enactment and supported by legislative appropriation.

THE SOUTH CAROLINA STATE CROP PEST COMMISSION

The act creating the State Crop Pest Commission was passed by the legislature in 1912. According to the act, five members of the Board of Trustees of Clemson College shall compose the Commission.

The purpose of the Commission is to prevent, as far as possible, the introduction into South Carolina of injurious plant pests and to limit the spread of those already within the State. The Commission
is also charged with the enforcement of the Bee Disease Act and the South Carolina Economic Poison Law.

The work is performed by the promulgation and enforcement of certain rules and regulations which in the judgment of the Commission are necessary to protect the agricultural interest of South Carolina. The enforcement of the regulations is the responsibility of the State Entomologist, State Plant Pathologist, and their agents.

THE ENGINEERING EXPERIMENT STATION

The Engineering Experiment Station of Clemson College was established by the Board of Trustees in July 1924. Its purpose is to coordinate and stimulate the research activities in the school of Engineering. These activities include the contribution of new knowledge in engineering science by prosecuting a vigorous program of basic research, the conduct of programs of developmental and applied research as a service to the industries of the State, and the determination of uses for the material resources of the State and thereby to encourage the growth of new industries.

The active research staff consists essentially of the faculty members of the School of Engineering and other divisions of the College. The laboratories of the several departments, as well as other special purpose space, are available to the Station in its investigations.

Research is the foundation for progress in a technological society. The well-equipped physical facilities and the thoroughly competent professional staff available to the Station constitute extremely valuable resources for continuing and expanding this research effort.

TEACHER EDUCATION

Agricultural Education. The members of the staff of Agricultural Education visit all beginning teachers for the purpose of assisting them on the job and also for the purpose of collecting information which may prove helpful in improving the work of teacher education at the College. In addition, conferences of teachers are held and consulting services made available in the interest of the professional growth of agricultural teachers, the rendering of service to agricultural communities, and the development of leadership among agricultural youth through the program of the Future Farmers of America.

Information concerning any phase of the in-service education activities in Agricultural Education may be secured by contacting the Head, Department of Agricultural Education, Clemson College.
Trades and Industrial Education. The College, in cooperation with the State Department of Education, is glad to assist those who teach vocational subjects in day trade schools and evening trade and industrial classes by supplying a trained man to assist in the work of organizing classes, organizing courses of study, making plans for teaching evening classes, and actually teaching vocational subjects. Requests for information regarding this service should be addressed to Mr. L. R. Booker, State Teacher Trainer in Industrial Education, Clemson, South Carolina.

SHORT COURSES AND CONFERENCES

The facilities of the College are made available for special meetings, such as farm groups, rural ministers, religious organizations, and scientific societies; and arrangements are made for special short courses in poultry, beekeeping, food preservation, cotton classing, dairy science, water supply, and sanitation, etc. Such activities, undertaken in the interest of the general welfare, are encouraged by the College.
## Enrollment by Counties and States

**First Semester, 1962-1963**

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## Grand Total

| Total | 4,252 |
### NUMBER OF STUDENTS MAJORING IN EACH CURRICULUM, FIRST SEMESTER, 1962-1963

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