

Weather Forecasting I. Advanced analysis of current weather data in Nowcasting.

**GR 4421/6421. Weather Forecasting I. (1)** (Prerequisite: GR 4411/6411). Two hours laboratory. Introduction to the process of creating and disseminating weather forecasts. Use of current weather data in creating daily forecasts for the local area.

**GR 4431/6431. Weather Forecasting II. (1)** (Prerequisite: GR 4421/6421). One hour lecture. One hour laboratory. Continuation of Weather Forecasting I. Emphasis placed on disseminating both oral and written forecasts for the local area.

**GR 4443. Weather Prediction I. (3)** (Prerequisite: GR 1603 or consent of instructor). Three hours video and online. Examination of the complexity of weather forecasting. Emphasis on numerical weather prediction, computer models, and mesoscale analysis.

**GR 4453. Weather Prediction II. (3)** (Prerequisite: GR 4443 or consent of instructor). Three hours video and online. Continuation of GR 4443. Case studies of weather events are used to develop independent weather forecasts. Emphasis on special weather events.

**GR 4503/6503. Practicum in Broadcast Meteorology I. (3)** (Prerequisite: GR 1603 or equivalent). Two hours lecture. Two hours laboratory. Introduction to television weather broadcasts with emphasis on creating accurate forecasts and on the techniques or communicating weather information to the public.

**GR 4513/6513. Practicum in Broadcast Meteorology II. (3)** (Prerequisite: GR 4503/6503). Two hours lecture. Two hours laboratory. Continuation of Practicum in Broadcast Meteorology I. Emphasis is placed on understanding the television studio as related to weathercasting.

**GR 4523/6523. Practicum in Broadcast Meteorology III. (3)** (Prerequisite: GR 4513/6513). Two hours lecture. Two hours laboratory. Continuation of Practicum in Broadcast Meteorology II. Emphasis placed on producing weather graphics for weather broadcasts.

**GR 4533/6533. Practicum in Broadcast Meteorology IV. (3)** (Prerequisite: GR 4523/6523). Two hours lecture. Two hours laboratory. Continuation of Practicum in Broadcast Meteorology III. Emphasis placed on studio performance of weathercasts.

**GR 4603/6603. Climatology. (3)** (Prerequisite: GR 1114 or GR 1123, or equivalent). Three hours lecture. Study of the elements and controls of weather and climate, distribution and characteristics of climatic regions.

**GR 4613/6613. Applied Climatology. (3)** (Prerequisites: GR 4633 or equivalent.) Two hours lecture. Two hours laboratory. Problem solving in today's world in topics such as bioclimatology, agricultural climatology and land use climatology.

**GR 4633/6633. Statistical Climatology. (3)** (Prerequisites: GR 4603/6603 or equivalent.) Two hours lecture. Two hours laboratory. A survey of the types of statistical weather data available. Manipulation of the data on various temporal and spatial scales.

**GR 4640/6640. Meteorological Internship. (1-6)** (Prerequisite: Consent of instructor). Hours and credits to be arranged. Internship with television station, private company or government agency under supervision of instructor.

**GR 4653/6653. Satellite and Radar Meteorology. (3)** (Prerequisite: GR 4603/6603). Three hours lecture. Study of the history, the operations, and the applications of satellites and radar in weather analysis. Theory of meteorological measurements in determinations of atmospheric structure.

**GR 4663. Satellite Meteorology. (3)** (Prerequisite: GR 4603 or consent of instructor). Three hours video and online. Study of the history, operations, and applications of satellites in weather analysis. Theory of meteorological measurements in determinations of atmosphere structure.

**GR 4673. Radar Meteorology. (3)** (Prerequisite: GR 4603 or consent of instructor). Three hours video and online. Detailed analysis of the use of Doppler radar in weather operations. Emphasis on Doppler velocity measurements, clear-air return, and severe storm identification and warning.

**GR 4703/6703. Severe Weather. (3)** (Prerequisites: GR 1603 or equivalent.) Three hours lecture. Descriptive study of severe and unusual weather across the earth. Explanation of variations in severe weather in both spatial and temporal scales.

**GR 4713/6713. Synoptic Meteorology I. (3)** (Prerequisites: GR 4603/6603 or equivalent.) Two hours lecture. Two hours laboratory. Fundamental principles behind weather forecasting. Physical processes in the atmosphere, atmospheric circulation systems, air mass analysis, frontogenesis and frontolysis.

**GR 4743/6743. Synoptic Meteorology II. (3)** (Prerequisite: GR 4713/6713). Two hours lecture. Two hours laboratory. Advanced analysis and detailed case studies of meteorological phenomena related to weather forecasting problems. Short and long-range forecasting techniques are presented.

**GR 4813/6813. Natural Hazards and Processes. (3)** (Prerequisites: GR 1114 or equivalent.) Three hours lecture. A survey of natural phenomena in geology, oceanography and astronomy as applied to meteorology. Detailed study of earthquakes, volcanoes, ocean movements, and solar activity.

**GR 4913/6913. Thermodynamic Meteorology. (3)** (Prerequisite: GR 1603 or equivalent). Three hours lecture. Examination of the meteorological stability within the earth's atmosphere. Focus on analysis of the various stability indices related to predicting severe weather.

**GR 4990/6990. Special Topics in Geosciences. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**GR 7000. Directed Individual Study.** Hours and credits to be arranged.

**GR 8000. Thesis Research/Thesis.** Hours and credits to be arranged.

**GR 8113. Meteorology I: Observations. (3)** (Prerequisite: Consent of instructor). Three hours video and online. Principles of meteorology with emphasis on elements, controls, and forecasting of atmospheric phenomena. Concentration on daily weather observations and the movement of weather systems. Primarily for K-12 science teachers.

**GR 8123. Meteorology II: Forecasting and Storms. (3)** (Prerequisite: GR 8113 or consent of instructor). Three hours video and online. Continuation of Meteorology I. Emphasis on the forecasting of daily weather events and on severe weather. Primarily for K-12 science teachers.

**GR 8313. Advanced Cultural Geography. (3)** (Prerequisite: Consent of instructor). Three hours lecture. Study and analysis of population distribution, densities, and movements; rural and urban settlement patterns and features; principles of cultural geography.

**GR 8323. Geography for Teachers. (3)** (Prerequisite: GR 1123 or equivalent). Three hours lecture. Systematic overview of geography designed for in-service teachers. Organized around the National Geography Standards, class lectures are augmented by lessons presented by K-12 teachers.

**GR 8400. Field Methods in Geosciences. (1-3)** (Prerequisite: Consent of Instructor). Hours and credits to be arranged. May be taken twice. Provides field experience in the geosciences through planned and supervised outdoor projects and field trips.

**GR 8542. Geographic Literature. (2)** (Prerequisite: Major or minor in geography). A reading course with emphasis on library research.

**GR 8553. Research Methods in Geoscience. (3)** (Prerequisite: Consent of instructor). Three hours seminar and forum. Defining research problems, formulating hypotheses, collecting data, using analytical techniques, substantiating conclusions for geoscience topics; written and oral presentations of research projects required.

**GR 8990. Special Topics in Geosciences. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

## HIGHER EDUCATION

Advisor: Assistant Professor Callais  
(For departmental information, see COUNSELOR EDUCATION.)

**HED 7000. Directed Individual Study.** Hours and credits to be arranged.

**HED 8113. Administration of Student Personnel Services in Higher Education. (3)** Three hours lecture. One hour laboratory. A study of the organization and administration of student personnel services with emphasis on health services, placement, financial aid and student housing.

**HED 8123. University and Community College Governance. (3)** Three hours lecture. A comprehensive survey of the field of administration of the community college and the university.

**HED 8133. University and Community College Instruction. (3)** Three hours lecture. A study of teaching methods and techniques, development of course content and instructional aids, and evaluation of student performance in the university and community college.

**HED 8143. Seminar in University and Community College Education. (3)** Three hours lecture. An in-depth analysis of current problems, strengths and issues confronting community college and university administrators and faculty.

**HED 8153. University and Community College Curriculum Development. (3)** Three hours lecture. A study of the practices, trends, and issues in university and community college programs of study and curriculum offerings.

**HED 8710. Practicum in University and Community College. (1-3)** Observation and supervised teaching activities in a university or community college.

**HED 8723. Internship in University and Community College Education (3)** Directed off-campus experiences designed to relate ideas and concepts to problems encountered in managing higher education programs.

**HED 8990. Special Topics in Higher Education. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

## Department of HISTORY

Office: 214 Allen Hall

Professors Uzoigwe (Head), Grill and Haug;

Professors Emeritus James, Lowery, Moore, Parrish, Radvanyi and Scott;

Associate Professors Jenkins and Damms;

Assistant Professors Barbier, Foote, Hale, Hay, Lester, Messer, Phillips and Wu.

**HI 1063. Early U.S. History. (3)** Three hours lecture. A survey of U.S. history through Reconstruction.

**HI 1073. Modern U.S. History. (3)** Three hours lecture. A continuation of HI 1063, covering the period from Reconstruction to the present.

**HI 1163. World History Before 1500. (3)** Three hours lecture. A survey of world history since prehistory until about 1500.

**HI 1173. World History Since 1500. (3)** Three hours lecture. A survey of world history since about 1500 until the present.

**HI 1183. Problems in Modern World Civilization. (3)** (Prerequisite: Open through invitation only). An honors course for freshmen. Three meetings each week. Readings, discussions, and reports.

**HI 1213. Early Western World. (3)** Three hours lecture. A survey of western world history from ancient times to about 1600.

**HI 1223. Modern Western World. (3)** Three hours lecture. A continuation of HI 1213, covering the period from the 17th century to the present.

**HI 1313. East Asian Civilizations to 1300. (3)** Three hours lecture. A survey of China and Japan and their peoples through a multi-disciplinary approach from pre-history until the thirteenth century.

**HI 1323. East Asian Civilizations Since 1300. (3)** Three hours lecture. A survey of China and Japan and their peoples through a multi-disciplinary approach from 1300 to the present.

**HI 2990. Special Topics in History. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**HI 3333. Mississippi History. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. A survey of Mississippi history examining economic, social, political, geographical, and cultural aspects of the state's past.

**HI 3703. The Western Church: Beginning to Reformation. (3)** (Prerequisites: Completion of any 1000-level course in history or philosophy and religion.) Three hours lecture. An examination of the institutions, doctrines, and spirituality of the Western Church and their impact on Western European politics, society, and culture. (Same as REL 3703).

**HI 3743. History of England. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. A survey of English history from its origins to the present.

**HI 3763. Hitler and Nazi Germany. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. A study of Adolf Hitler's personality and rise to power; and examination of the theory and practice of National Socialism.

**HI 3773. (3) History of the Holocaust. (3)** (Prerequisite: Completion of any 1000-level history course or consent of the instructor). Three hours lecture. An examination of the role of perpetrators, victims, and bystanders during the Holocaust.

**HI 3853. The United States and Latin America. (3)** (Prerequisite: Completion of any 1000-level history course.) Three hours lecture. History of foreign policies and diplomatic relations in the nineteenth and twentieth centuries with an emphasis on strategic and security issues.

**HI 3893. 20th Century World History. (3)** (Prerequisite: completion of any 1000 level history course). Three hours lecture. Study of the world since 1900 concentrating of the themes of imperialism, nationalism, war and industrialization.

**HI 3903. Historiography and Historical Method. (3)** (Prerequisites: Junior or senior standing). Three hours lecture. The writings and interpretations of leading European and American historians, bibliographical aids, methods of research, preparation of bibliographies, practice in writing a research paper.

**HI 4000. Directed Individual Study.** Hours and credits to be arranged.

**HI 4103/6103. Colonial America. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. Study of the earliest English settlements to 1740. Emphasis on Puritanism, interaction with other people, expansion and forming of societal and political institutions.

**HI 4113/6113. U.S. History 1783-1825. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. An advanced course in the history of the United States, 1783-1825, with emphasis on economic, social, political, and constitutional developments.

**HI 4123/6123. Jacksonian America 1825-1850. (3)** (Prerequisites: Completion of any 1000-level history course). Three hours lecture. America from the beginnings of the Jacksonian movement, its political, economic and social battles, through trans-continental expansion and the Mexican War.

**HI 4133/6133. Civil War and Reconstruction 1850-1877. (3)** (Prerequisites: Completion of any 1000-level history course). Three hours lecture. Origins of the secessionist movement and the Civil War, the political and military battles of the War, and the struggle to reunify the nation.

**HI 4143/6143. Revolutionary America. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. American provinces from 1740 until 1783. Emphasis on maturation, pluralism, role in British empire, religion, Enlightenment, and causes, ideology, and conduct of the Revolution.

**HI 4153/6153. U.S. History 1877-1917. (3)** (Prerequisites: Completion of any 1000-level history course). Three hours lecture. A survey of political, economic, social, and constitutional developments.

**HI 4163/6163. U.S. 1917-1945. (3)** (Prerequisites: Completion of any 1000-level history course). Three hours lecture. A study of all major aspects of American government and life through World War II.

**HI 4173/6173. U.S. History Since 1945. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. A study of all major aspects of American government and life since the end of World War II.

**HI 4183/6183. U.S. Economic History. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. An intensive study of economic change in the United States and its impact on political and social development. (Same as EC 4183/6183).

**HI 4203/6203. Diplomatic History of the U.S. (3)** (Prerequisites: Completion of any 1000-level history course). Three hours lecture. A study of American foreign policy from the founding of the Republic to the present time.

**HI 4233/6233. War, Peace, and Society: The American Experience. (3)** (Prerequisites: Completion of any 1000-level history course). Three hours lecture. A survey of the military history of the United States from colonial times to the present.

**HI 4243/6243. American Life and Thought. (3)** Three hours lecture. A survey of the changing lives and ideas of Americans from colonial to modern times. Family life, religion, recreation, dress, communities, social theories, medicine.

**HI 4253/6253. Religion in America. (3)** (Prerequisite: Completion of any 1000 level history course). Three hours lecture. Surveys history of religion in America, emphasizing interaction with social and political developments. (Same as REL 4253/6253).

**HI 4263/6263. America's Viet Nam War. (3)** (Prerequisite: Completion of any 1000 level history course). Three hours lecture. Analysis of the U.S. conduct of Viet Nam War including such as: Cold War context,

presidential decision-making, military doctrine, domestic opposition, and legacy.

**HI 4273/6273. Women in American History. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. A study of the economic, political, and social activities of women in American history. Emphasis on Southern women.

**HI 4283/6283 History of Southern Women. (3)** Three hours lecture. The lives and images of women in the South from colonial times to the present. Native-, African-, and European-American women to be studied.

**HI 4303/6303. The Old South. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. Development of the Old South from colonization through the slavery controversy and the Civil War.

**HI 4313/6313. The New South. (3)** (Prerequisites: Completion of any 1000-level history course). Three hours lecture. Southern life from Reconstruction times to the present.

**HI 4323/6323. The American West. (3)** (Prerequisites: Completion of any 1000-level history course). Three hours lecture. A survey of the western frontier in American history from colonial times to 1900.

**HI 4363/6363. African-American History and Culture. (3)** (Prerequisite: Completion of any 1000 level history course). African-Americans from their African origins to the present, emphasizing black-white relations in the making of America.

**HI 4373/6373. History of Modern Civil Rights Movement. (3)** (Prerequisite: Completion of any 1000 level history course). Three hours lecture. A history of the Black struggle for equality in the United States between 1930 and 1970.

**HI 4403/6403. The Ancient Near East. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. A study of the origins and development of civilizations in Mesopotamia, Egypt, and Syria-Palestine from prehistoric times to the end of the Persian period. (Same as REL 4403/6403).

**HI 4413/6413. Ancient Greece and Rome. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. A survey of the civilization of ancient Greece and Rome.

**HI 4563/6563. Viet Nam Between Revolution and War, 1940-1990. (3)** (Prerequisite: completion of any 1000-level history course or consent of instructor). Three hours lecture. The drama of modern Viet Nam that defined an entire era of decolonization and Cold War division. Historical roots, competing political visions, and sociocultural changes.

**HI 4583/6583. China Since 1800. (3)** (Prerequisite: Completion of any 1000-level history course or consent of instructor). Three hours lecture. China's tumultuous centuries of imperial decline, foreign assault, and nationalist and communist revolutions. Cultural and social transformations and the quest for institutional and economic modernization.

**HI 4593/6593. Japan Since 1600. (3)** (Prerequisite: Completion of any 1000-level history course or consent of instructor). Three hours lecture. Examines the major political, cultural, economic, military and diplomatic events that have brought Japan from sheltered feudalism to international preeminence.

**HI 4603/6603. Medieval Civilization. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. An intensive study of medieval institutions and culture.

**HI 4623/6623. The Vikings. (3)** (Prerequisite: Junior standing or consent of the instructor). Three hours lecture. A survey in English of the Vikings and the Viking Age. (Same as FL 4623/6623)

**HI 4643/6643. Renaissance and Reformation. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. The Renaissance and its relation to religion, politics, and social life; origins of the Reformation movement and its effect on Europe in early modern times.

**HI 4653/6653. The History of Science and Technology. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. Science and technology from Newton to the present, emphasizing the relationship between scientific innovation and technological application.

**HI 4673/6673. Europe, 1789-1914. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. A study of the political, economic, and intellectual foundations of nineteenth century society.

**HI 4683/6683. Europe: The First World War to Hitler. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. European development from the beginning of the First World War to the beginning of the Second World War.

**HI 4693/6693. Europe: The Second World War to the Common Market. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. European development from the beginning of the Second World War to the present time.

**HI 4703/6703. England to 1485. (3)** (Prerequisite: Completion of any 1000 level history course). Three hours lecture.

**HI 4713/6713. Tudor and Stuart England. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. The development of English institutions during the Tudor and Stuart periods.

**HI 4753/6753. History of Russia. (3)** (Prerequisite: Completion of any 1000-level history course.) Three hours lecture. The political, social, cultural, and economic development of Russia from Kievan to Soviet times.

**HI 4763/6763. History of Modern Germany. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. The history of German institutions in modern times.

**HI 4773/6773. History of Modern France. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. The history of French institutions in modern times.

**HI 4783/6783. African Civilization to 1880. (3)** (Prerequisite: Completion of any 1000-level history course or consent of instructor). Three hours lecture. This is a survey course which traces the major developments in Africa to 1880.

**HI 4793/6793. Modern Africa. (3)** (Prerequisite: Completion of any 1000-level history course or consent of instructor). Three hours lecture. This course traces Africa's history from 1880 to the present. It discusses how Africa lost and regained its sovereignty and the dilemma of independence.

**HI 4833/6833. Colonial Latin America. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. A survey of Latin America in the colonial era: geographical setting, native cultures, conquest and colonization, Portuguese and Spanish colonial administration, cultural development.

**HI 4843/6843. Latin-American Republics. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. Modern Latin-American republics from the wars of independence to the present day, with special attention to Inter-American relations.

**HI 4853/6853. Modern Mexico. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. The political, economic, and social development of the Mexican nation from Independence through the age of dictators to the Great Revolution and its aftermath.

**HI 4903/6903. The Far East. (3)** (Prerequisite: Completion of any 1000-level history course). Three hours lecture. A study of the impact of western civilization on China, Japan, and India in the nineteenth and twentieth centuries.

**HI 4990/6990. Special Topics in History. (1-9)** (Credit and title to be arranged). This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

## General

**HI 7000. Directed Individual Study.** Hours and credits to be arranged.

**HI 8000. Thesis Research and Thesis.**

**HI 8803. Graduate Colloquium. (3)** (Prerequisite: Graduate standing). Three hours lecture. Topical focus to be determined by the faculty member conducting the colloquium. (May be taken for credit more than once).

**HI 8923. Historiography and Historical Method. (3)** (Prerequisite: Graduate standing). Three hours lecture. The writings and interpretations of leading European and American historians; bibliographical aids in history; methods of research; preparation of bibliographies; practice in writing a research paper.

**HI 8990. Special Topics in History. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**HI 9000. Dissertation Research and Dissertation.**

## Directed Readings

**HI 8103. Readings in Colonial American History. (3)** (Prerequisite: Graduate standing).

**HI 8113. Readings in U.S. History, 1783-1825. (3)** (Prerequisite: Graduate standing).

**HI 8123. Readings in Jacksonian America. (3)** (Prerequisite: Graduate standing).

**HI 8133. Readings in the Civil War and Reconstruction. (3)** (Prerequisite: Graduate standing).

**HI 8153. Readings in U.S. History, 1877-1917. (3)** (Prerequisite: Graduate standing).

**HI 8163. Readings in Contemporary United States. (3)** (Prerequisite: Graduate standing).

**HI 8203. Readings in American Diplomatic History. (3)** (Prerequisite: Graduate standing).

**HI 8233. Readings in American Military History. (3)** (Prerequisite: Graduate standing).

**HI 8263. Readings in American Economic Developments. (3)** (Prerequisite: Graduate standing).

**HI 8273. Readings in Women in American History. (3)** (Prerequisite: Graduate standing).

**HI 8283. Readings in Women in Southern History. (3)** (Prerequisite: Graduate standing).

**HI 8303. Readings in the Old South. (3)** (Prerequisite: Graduate standing).

**HI 8313. Readings in the New South. (3)** (Prerequisite: Graduate standing).

**HI 8323. Readings in the American West. (3)** (Prerequisite: Graduate standing).

**HI 8353. Readings in African-American History and Culture. (3)** (Prerequisite: Graduate standing).

**HI 8733. Readings in Colonial Latin America. (3)** (Prerequisite: Graduate standing).

**HI 8743. Readings in Latin-American Republics. (3)** (Prerequisite: Graduate standing).

**HI 8403. Readings in Ancient History. (3)** (Prerequisite: Graduate standing).

**HI 8423. Readings in Medieval History. (3)** (Prerequisite: Graduate standing).

**HI 8443. Readings in Renaissance and Reformation. (3)** (Prerequisite: Graduate standing).

**HI 8503. Readings in European History, 1600-1789. (3)** (Prerequisite: Graduate standing).

**HI 8523. Readings in European History. 1789-1914. (3)** (Prerequisite: Graduate standing).

**HI 8533. Readings in European History, 1914-Present. (3)** (Prerequisite: Graduate standing).

**HI 8613. Readings in English History, 1485-1714. (3)** (Prerequisite: Graduate standing).

**HI 8623. Readings in English History Since 1714. (3)** (Prerequisite: Graduate standing).

**HI 8753. Readings in Russian History. (3)** (Prerequisite: Graduate standing).

**HI 8763. Readings in the Far East. (3)** (Prerequisite: Graduate standing).

### Seminars

**HI 8813. Seminar in U.S. History Before 1877. (3)** (Prerequisite: Graduate standing).

**HI 8823. Seminar in U.S. History Since 1877. (3)** (Prerequisite: Graduate standing).

**HI 8833. Seminar in Southern History. (3)** (Prerequisite: Graduate standing).

**HI 8863. Seminar in European History Since 1789. (3)** (Prerequisite: Graduate standing).

**HI 8883. US Agricultural History, 1500-2000. (3)** (Prerequisite: Graduate standing). Three hours seminar. An intensive study of agricultural and rural development in the United States and its impact on social, economic, and political changes.

**HI 8913. Seminar in Quantitative Methods for Historical Research. (3)** (Prerequisite: Graduate standing).

## School of HUMAN SCIENCES

Office: 128 Lloyd-Ricks

Interim Director: Gary B. Jackson

Professors Dodson and Taylor;

Associate Professors Bateman, P. Miller, and Oakley;

Assistant Professors Byrd, Cheek, Lokken-Worthy, Malone, and B. Miller;

Instructor Sutphin; Lecturer: Bioley, Batchelder, Boutwell, Carroll, Hauser,

Johnson, Jones, Lewis, and Matich

**HS 1711. Professional Protocol. (1)** One hour lecture. The essentials of professional protocol and accepted standards of social usage.

**HS 1523. Visual Design in Dress. (3)** Three hours lecture. Application of basic art principles to selection and design of clothing; physical, cultural, social, aesthetic, and psychological aspects of dress.

**HS 1533. Apparel Design I. (3)** One hour lecture. Four hours laboratory. Principles of clothing construction; problems involving fabric selection, use of commercial patterns, basic fitting.

**HS 1701. Survey of Human Sciences. (1)** One hour lecture. Introduction to the field of human sciences through a study of its history and the variety of professional careers available.

**HS 1802. Professional Seminar I. (2)** Two hours lecture. Overview of individual development and the family life cycle with emphasis on professional opportunities in the field.

**HS 2203. Science of Food Preparation. (3)** One hour lecture. Four hours laboratory. A study of foods and the principles underlying handling and preparation of food products to maintain the highest standard of quality.

**HS 2233. Meal Management. (3)** One hour lecture. Four hours laboratory. Planning, preparing, and serving meals; emphasis on management of time, energy, and money in relation to feeding the family.

**HS 2283. Child Health and Nutrition. (3)** Three hours lecture. Nutrition requirements during pregnancy and lactation, and of infants and young children; birth defects from metabolic errors; related health of young children.

**HS 2293. Individual and Family Nutrition. (3)** Three hours lecture. Fundamental principals of human nutrition and the practical application of this knowledge in the selection of adequate diets.

**HS 2523. Introductory Textiles. (3)** (Prerequisite: CH 1043). Two hours lecture. Two hours laboratory. A basic study of fibers, yarns, fabric structure, and factors influencing selection, appearance, care and serviceability of textiles and fabrics.

**HS 2553. Fashion Merchandising. (3)** Three hours lecture. A survey of the entire fashion industry as it relates to fashion merchandising.

**HS 2573. Microcomputer Applications for Human Sciences. (3)** Two hours lecture. Two hours laboratory. Application of microcomputer technology for human sciences.

**HS 2593. Apparel/Sewn Product Analysis and Evaluation. (3)** Two hours lecture. Two hours laboratory. Analysis of design and construction entities that affect cost, consumer perception, consumer satisfaction, marketability and profits of various items of apparel/sewn products.

**HS 2613. Introduction to Interior Environments. (3)** (Prerequisite: ART 1123 or consent). Two hours lecture. Two hours laboratory. Introduction to design theory and its application in the development of criteria for interior environments.

**HS 2633. Interior Materials, Treatments and Resources. (3)** (Prerequisite: HS 2523 or concurrent enrollment). Three hours lecture. Materials, equipment, services and resources available to the interior designer for meeting clients' needs.

**HS 2803. Pre-natal and Infant Development. (3)** Two hours lecture. Two hours laboratory. Biological and environmental influences; behavioral and developmental patterns, from the onset of pregnancy to toddlerhood.

**HS 2813. Child Development I. (3)** (Prerequisite: PSY 1013). Two hours lecture. Two hours laboratory. Developmental characteristics of children with emphasis on the early years; implications for care and guidance. Observation and participation in the Child Development and Family Studies Center.

**HS 2990. Special Topics in Human Sciences. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**HS 3000. Field Experience. (1-6)** (Prerequisite: Consent of instructor). Supervised field experience for human sciences students; an internship in an approved, option-related situation.

**HS 3113. Wine Appreciation. (3)** Three hours lecture. Principles of wine identification, evaluation and service with emphasis on the wines of Europe and the United States.

**HS 3263. Research Methods in Food and Nutrition. (3)** (Prerequisites: ST 2113, HS 2293). Two hours lecture. Two hours laboratory. Introduction to food and nutrition research methods, application of computer and related technologies in nutrition research through design and development of a research project.

**HS 3274. Quantity Food Production and Service. (4)** (Prerequisite: HS 2233 or consent of instructor). One hour lecture. Eight hours laboratory. Principles and methods of preparation and service of food in quantity.

**HS 3283. The Food Service System. (3)** Three hours lecture. Introduction to the food service system concept, functional subsystems, and management of financial and human resources.

**HS 3303. Consumer Economics. (3)** (Prerequisite: EC 2113 or Junior Standing and consent of instructor). Three hours lecture. Economic principles as they apply to consumer situations, and the consumer's relation to the American and world economy.

**HS 3553. Fashion Retailing. (3)** (Prerequisites: HS 2553 or consent of instructor). Three hours lecture. Specific problems, procedures and practices in fashion retailing.

**HS 3563. Visual Merchandising. (3)** (Prerequisite: HS 2553 or consent of instructor). Two hours lecture. Two hours laboratory. Principles of window and interior display, individual and group participation in designing and executing displays for commercial and educational purposes.

**HS 3573. Historic Costume. (3)** Two hours lecture. Two hours laboratory. Survey of costume from prehistoric to modern times with emphasis on social, cultural, political, and technological changes impacting fashion, preservation, documentation, and exhibition of artifacts.

**HS 3593. Merchandising and Promotion Strategies. (3)** (Prerequisite: HS 2553 or consent of instructor). Three hours lecture. A study of fashion presentation techniques and production requirements in the primary, secondary and retail settings.

**HS 3611. Portfolio Presentation: Methods and Media. (1)** (Prerequisites: HS 2613, ART 1213, ART 1133, EG 1513). One hour lecture. Portfolio presentation techniques for the professional practice of interior design.

**HS 3623. Space Planning. (3)** (Prerequisite: HS 2613). Two hours lecture. Two hours laboratory. Physical and socio-economic aspects of planning residential and non-residential spaces.

**HS 3643. History of Interiors I. (3)** Three hours lecture. A survey of furniture styles, ornament, designers, and accessories associated with period interiors from the early Egyptian period through 1850.

**HS 3653. History of Interiors II. (3)** (Prerequisite: HS 3643 or consent of instructor). Three hours lecture. Technological advancement and subsequent evolution of design philosophies reflected in furnishings and interiors of the late nineteenth and twentieth centuries.

**HS 3663. Color and Lighting for Interiors. (3)** (Prerequisite: HS 2613). One hour lecture. Four hours laboratory. Concentrated study of color and light relationships as they apply to the visual, technical and functional aspects of interior spaces.

**HS 3673. Environments for Special Needs. (3)** (Prerequisite: HS 2613 or consent of instructor). Three hours lecture. Laws, attitudes, conditions, specifications, and environmental issues affecting private and public spaces.

**HS 3803. Child Care Procedures. (3)** (Prerequisites: HS 2813). Two hours lecture. Two hours laboratory. Selection of appropriate equipment and supplies; program planning for nursery school and day care centers, observation and participation in the Child Development Center.

**HS 3813. Child Development II. (3)** (Prerequisites: HS 2813 and junior standing). Three hours lecture. An intensified exploration of child development theory, research and methodology used in the study of the young child (birth to five). Major emphasis on process of development.

**HS 3823. Designing Child Care Programs. (3)** (Prerequisites: HS 3803 and HS 3813). Two hours lecture. Two hours laboratory. Designing programs for nursery-age children with emphasis on children's developmental characteristics as related to appropriate learning experiences.

**HS 4000. Directed Individual Study in Human Sciences.** Hours and credits to be arranged.

**HS 4193/6193. Social and Cultural Aspects of Food. (3)** Three hours lecture. A study of international, regional and religious history, customs, beliefs and other impacts upon food preparation and consumption.

**HS 4213. Nutrition Public Policy and Promotion. (3)** (Prerequisite: HS 2293). Three hours lecture. Addresses the role of the public and private sectors in identifying and addressing the nutritional needs of various population groups.

**HS 4233/6233. Medical Nutrition Therapy. (3)** (Prerequisites: HS 3213, HS 4223, BCH 3613, BIO 2014 or consent of instructors). Two

hours lecture. Two hours laboratory. Treatment of human diseases through nutrient modification. (Same as NTR 6233)

**HS 4243/6243. Nutrition Throughout the Life Cycle. (3)** (Prerequisite: HS 4223/6223 or consent of instructor). Three hours lecture. Study of interrelationships of physiological, biochemical and sociological factors and nutrient needs of individuals and groups during the life cycle; infancy through the later years. (Same as NTR 6243).

**HS 4253/6253. Human Nutrition I. (3)** (Prerequisites: BIO 2014 and CH 2503 or equivalent). Three hours lecture. Advanced human nutrition: digestion, metabolism, function, requirements, and recommendations for carbohydrates, lipids, proteins and water. (Same as NTR 4253/6253).

**HS 4273/6273. Nutritional Assessment. (3)** (Prerequisite: BCH 3613 and HS 4223 or equivalent). Two hours lecture. Two hours laboratory. Selection, utilization, interpretation, and evaluation of anthropometric, laboratory, clinical and dietary methods available for the assessment of nutritional status.

**HS 4274/6274. Advanced Food Service Management. (4)** (Prerequisites: HS 3274, HS 4283). One hour lecture. Eight hours laboratory. Practical experience in the management of quantity food production for specialty dinners and catering, including purchasing and cost accounting.

**HS 4283/6283. Purchasing Food and Equipment for Foodservice Systems. (3)** Three hours lecture. Procuring food and equipment for foodservice systems. Product specifications, cost-effectiveness, value analysis, and quality standards.

**HS 4293/6293. Human Nutrition II. (3)** (Prerequisites: BIO 4253/6253 or consent of instructor). Three hours lecture. Advanced human nutrition and metabolism with emphasis on the functions, requirements, and recommendations of the regulatory nutrients (vitamins and minerals) and water. (Same as NTR 4293/6293).

**HS 4313/6313. Family Resource Management. (3)** Three hours lecture. Decision-making in the family and operation of the household as affected by family values, philosophies, resources, and socio-economic conditions.

**HS 4323/6423. Consumer Issues and Policy. (3)** (Prerequisite: HS 3303 or consent of instructor). Three hours lecture. An assessment of policies and programs relating to information, product safety, and channels of appeal for the individual.

**HS 4333/6333. Families, Legislation and Public Policy. (3)** (Prerequisite: Junior Standing). Three hours lecture. An examination of the impact of legislation and public policy on the well being of the family with emphasis on policy and family change.

**HS 4343/6343. Apparel Design II. (3)** (Prerequisite: HS 1533 or consent of instructor). One hour lecture. Four hours laboratory. Advanced problems and techniques for clothing construction; creative expression through application of techniques of flat pattern design.

**HS 4403/6403. Introduction to Gerontology. (3)** Three hours lecture. An introduction to the dynamics of the aging process and strategies for maximizing life satisfaction during aging.

**HS 4423/6423. Teaching Human Sciences. (3)** (Prerequisite: Consent of advisor). Three hours lecture. The function of human sciences education in the educational system. Curriculum structure, classroom methods, media and evaluation.

**HS 4450/6450. Work Experience in Human Sciences Related Occupations. (3-6)** Work experience in two phases of occupational human sciences, development of a program of work, and incorporating the work experience into curricula.

**HS 4462. Curriculum in Human Sciences. (2)** (Prerequisites: Senior standing and admission to Teacher Education). Two hours lecture. Spring semester. Bases for curriculum planning, exemplar curriculum, and customizing curriculums.

**HS 4513/6513. Social-Psychological Aspects of Clothing. (3)** (Prerequisite: Three hours Sociology or Psychology). Three hours lecture. Exploration of the sociological and psychological aspects of wearing apparel; man's response to and use of clothing as an aspect of behavior at different life stages.

**HS 4563. Intermediate Textiles. (3)** (Prerequisite: HS 2523). Two hours lecture. Two hours laboratory. A basic study of dyes, color applications, finishes and physical testing used in manufacturing textiles.

**HS 4583/6583. Home-Based Entrepreneurship. (3)** Three hours lecture. Exploration of services/products that have potential for home-based businesses with emphasis on business, marketing, and management skills necessary for operation of these businesses.

**HS 4613/6613. Residential Interior Design Studio I. (3)** (Prerequisite: HS 2613, HS 4733 or concurrent enrollment). One hour lecture. Four hours laboratory. Integration of the total living environment, through the application of the design elements and technical aspects of the field.

**HS 4623/6623. Commercial Interior Design Studio I. (3)** (Prerequisite: HS 4613). One hour lecture. Four hours laboratory. Actual practice in the commercial design field through the execution of commercial design problems.

**HS 4643/6643. Residential Interior Design Studio II. (3)** (Prerequisite: HS 4613). One hour lecture. Four hours laboratory. Integration of the total living environment, through the application of the design elements and technical aspects of the interior design field.

**HS 4653/6653. Commercial Interior Design Studio II. (3)** (Prerequisite: HS 4623/6623). One hour lecture. Four hours laboratory. Advanced study of commercial interior design problems through the individual research and the execution of design solutions.

**HS 4663/6663. Professional Procedures and Practices for Interior Designers. (3)** (Prerequisite: HS 4613, HS 4623). Three hours lecture. Professional opportunities as they relate to individual competencies. Study of studio procedures, ethics, business and legal aspects. Preparation of resume and portfolio presentation.

**HS 4683/6683. Current Housing Problems of Families. (3)** (Prerequisite: Junior standing). Three hours lecture. Analysis of current housing problems confronting families, their historical development, government policies and remedial measures.

**HS 4693. Furniture Design. (3)** (Prerequisite: EG 1513, HS 3643, HS 3653 and consent of instructor). Two hours lecture. Two hours laboratory. Exploration of the basic methods and processes of furniture design.

**HS 4701. Internship Placement Seminar. (1)** (Prerequisite: Junior standing and consent of instructor). One hour lecture. Preparation for an internship in a chosen specialization.

**HS 4702. Human Sciences Senior Seminar. (2)** (Prerequisite: Senior standing in Human Sciences). Two hours lecture. Examination of current societal issues and trends using an integrative approach. Emphasis on professional development and effectiveness in Human Sciences.

**HS 4710/6710. Study Tour. (1-3)** Experiential learning through travel in the United States or abroad focusing on specialized areas of study in human sciences.

**HS 4733/6733. Computer-Aided Design for Human Sciences. (3)** (Prerequisites: CSE 1013 or equivalent). Two hours lecture. Two hours laboratory. Applications of computer-aided design for interior design, fashion merchandising, child development, human sciences education, consumer economics, foods and nutrition.

**HS 4750. Internship. (6-8)** (Prerequisite: Minimum of senior standing, 2.0 and consent of instructor). Individual work experience in an approved setting under supervision of Mississippi State University faculty.

**HS 4803/6803. Art of Parenting. (3)** (Prerequisite: Junior standing). Three hours lecture. Study of the child as a part of the family in a dynamic transactional system. Emphasis on economics, stress, practical problems and child services.

**HS 4823/6823. Development and Administration of Child Service Programs. (3)** (Prerequisite: HS 3813 or concurrent enrollment). Three hours lecture. Planning, administering, and evaluating the organizational structure of a variety of child service programs.

**HS 4834. The Hospitalized Child. (4)** (Prerequisites: HS 3813 or concurrent enrollment, junior standing and permission of the instructor). Three hours lecture. Two hours laboratory. A pre-practicum develop-

ment approach to the special needs of the hospitalized infant, child, and adolescent.

**HS 4843/6843. Family Interaction. (3)** (Prerequisites: SO 1203 and PSY 1013 or HS 4853). Three hours lecture. Interaction within functional families; focus on the family as a system, on diversity and roles, and on effective interactions.

**HS 4853/6853. The Family: A Transactional Approach. (3)** (Prerequisite: Three hours Sociology or Psychology and Junior Standing). Three hours lecture. The impact of internal and external factors on the development of individual and family relationships throughout the life cycle.

**HS 4863/6863. Consumer Aspects of Aging. (3)** (Prerequisite: HS 3303 or consent of instructor). Three hours lecture. Analysis of the decisions, issues and research related to the consumer aspects of aging from a global and national perspective.

**HS 4886, 4896. Student Teaching Vocational Human Sciences. (6,6)** (Both courses to be taken concurrently). (Prerequisites: Admission to Teacher Education and senior standing). Supervised observation and directed teaching in respective field of endorsement.

**HS 4990/6990. Special Topics in Human Sciences. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**HS 7000. Directed Individual Study in Human Sciences.** Hours and credits to be arranged.

**HS 8233. Maternal, Infant, and Child Nutrition. (3)** Three hours lecture. Nutritional needs during reproduction and growth; problems in nourishing women during the reproductive period, infants, and children; indices of growth and development. (Same as NTR 8233.)

**HS 8243. Community Nutrition. (3)** (Prerequisite: HS 3213 or consent of instructor). Three hours lecture. Nutrition services and problems in the community. Supervised experience in methods for determining and implementing action programs in nutrition education. (Same as NTR 8243.)

**HS 8261. Dietetic Internship Seminar. (1)** (Prerequisite: Admission into the School of Human Sciences Dietetic Internship/Graduate Studies Program). One hour lecture. Selection of current topics in foods, nutrition or dietetics and in-depth review of current literature for critical analysis presentation. (Same as NTR 8261).

**HS 8273. Dietetic Internship Capstone. (2)** (Prerequisite: Admission into the School of Human Sciences Dietetic Internship/Graduate Studies Program). Three hours lecture. Theoretical aspects of dietetics gained through the study of resources, technology, professional standards, and other factors that influence entry-level practice.

**HS 8286. Supervised Practice Experience. (6)** (Prerequisite: Admission into the School of Human Sciences Dietetic Internship/Graduate Studies Program). Supervised practice experiences in clinical, community, and food service systems settings. May be repeated for credit.

**HS 8990. Special Topics in Human Sciences. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

## INTERNATIONAL BUSINESS

Office: 355-356 McCool Hall

Director: Lox

**IB 2990. Special Topics in International Business. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**IB 3900. Internship Work. (1-6)**. (Prerequisite: approval of the International Business Director). Business topics examined by student during work semester. Student evaluations are assigned on satisfactory/unsatisfactory basis.

**IB 3913. Principles of International Business. (3)** (Prerequisites: Senior standing in business or consent of instructor.) An overview of the major forms of international business: Exports and imports, overseas investments, production and marketing operations, licensing, financing and other international business services.

**IB 4903. Internship Academic Report. (3)** (Prerequisite: Satisfactory performance in IB 3900). Individual work experience under faculty guidance in business. Scholarly paper on approved topic required.

**IB 4990/6990. Special Topics in International Business. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**IB 8913. International Business Environment. (3)** (Prerequisites: The equivalent of ACC 2023, EC 2123, FIN 3113, FIN 3123, MGT 4113, and MKT 3013 or consent of instructor). Study of the management problems, strategies, and techniques arising from the international transfer of goods, services, human resources, technology, finance, or ownership.

**IB 8990. Special Topics in International Business. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

## Department of INDUSTRIAL ENGINEERING

Office: 125 McCain Engineering Building

Professors Brown (head), Bowden, Bullington, and Usher;  
Professors Emeriti Cotton, Parker, and Oswalt;  
Associate Professors Duffy, Greenwood, and Smyer  
Assistant Professors Eksioğlu, Jin, and McGilberry

**IE 1911. Introduction to Industrial Engineering. (1)** Three hours laboratory. Concepts of industrial engineering, emphasizing the total systems approach. Introduction to analysis and design of general and industrial systems.

**IE 2990. Special Topics in Industrial Engineering. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**IE 3124. Industrial Ergonomics. (4)** (Co-requisite: IE 4613). Three hours lecture. Three hours laboratory. Analysis of work tasks; ergonomic design principles for manual work design, workplace design, and work environment design; work measurement; and design of wage payment plans.

**IE 3323. Manufacturing Processes. (3)** (Prerequisites: Grade of C or better in IE 3913, Co-requisites: CHE 3413 and IE 4613). Two hours lecture. Three hours laboratory. Manufacturing processes and materials; interrelationship of product design, material properties, and processing methods; robotics and CAM systems; economic factors in material, process, and equipment selection.

**IE 3913. Engineering Economy I. (3)** (Prerequisite: MA 1713). Three hours lecture. Principles of evaluating alternative engineering proposals. Economic measures of effectiveness, costs and cost estimates, basic comparative models, break even and replacement analysis.

**IE 4000. Directed Individual Study.** Hours and credits to be arranged.

**IE 4113/6113. Human Factors Engineering. (3)** (Prerequisite: Junior standing in engineering). Two hours lecture. Three hours laboratory. Human capabilities and limitations affecting communications and responses in man-machine systems. Emphasis on physiological and psychological fundamentals.

**IE 4123/6123. Psychology of Human-Computer Interaction. (3)** (Prerequisite: PSY 3713 or CSE 4663/6663 or IE 4113/6113 or consent of the instructor). Two hours lecture. Two hours laboratory. Exploration of psychological factors that interact with computer interface usability. Interface design techniques and usability evaluation methods are emphasized. (Same as CSE 4673/6673 and PSY 4743/6743).

**IE 4173/6173. Occupational Safety Engineering. (3)** (Prerequisite: Junior standing). Three hours lecture. Causes and prevention of industrial accidents. Analysis of hazardous processes and materials. Design of occupational safety systems and programs.

**IE 4333/6333. Production Control Systems I. (3)** (Prerequisite: Grade of C or better in IE 4613). Three hours lecture. Principles, analysis, and design of production and inventory planning and control. Demand forecasting, production scheduling and control systems and introduction to CPM.

**IE 4353/6353. Materials Handling. (3)** (Prerequisite: IE 3123). Three hours lecture. Analysis and design of materials handling systems and components. Introduction to facilities design.

**IE 4373/6373. Automation. (3)** Two hours lecture. Three hours laboratory. Introduction to the various technologies used in both design and manufacturing automation.

**IE 4393/6393. Concurrent Engineering. (3)** (Prerequisite: Junior or senior standing). Three hours lecture. An introduction to the implementation, application, and management of concurrent engineering, as well as, the tools and techniques that support new product development.

**IE 4513/6513. Engineering Administration. (3)** (Prerequisite: Senior or graduate standing in engineering). Three hours lecture. Study of problems confronting the engineering manager. Includes: Organization and communication theory, internal and external relationships and responsibilities, and designing and implementing managerial systems.

**IE 4533/6533. Project Management. (3)** (Prerequisites: Grade of C or better in IE 4613). Three hours lecture. Use of CPM, PERT, and GERT for planning, managing and controlling projects. Computer procedures for complex networks.

**IE 4543/6543. Logistics Engineering. (3)** (Prerequisite: IE 4613 and senior or graduate standing). Three hours lecture. Analysis of complex logistics networks. Integration or supply, production, inventory, transportation, and distribution. Strategies for reducing logistics costs and lead times. Customer-supplier partnerships.

**IE 4553/6553. Engineering Law and Ethics. (3)** (Prerequisite: Senior standing in engineering). Three hours lecture. The engineer and his relations to the law, to the public, and the ethics of his profession. Includes

contracts, patents, copyrights, sales agreements, engineering specifications.

**IE 4573/6573. Process Improvement Engineering. (3)** Three hours lecture. Introduction to quality and productivity improvement methodologies and tools. The design and implementation of continuous improvement systems in organizations.

**IE 4613/6613. Engineering Statistics I. (3)** (Prerequisite: MA 1723). Three hours lecture. Introduction to statistical analysis. Topics include: probability, probability distributions, data analysis, and statistical inferences. Simple, multiple, and polynomial models for regression and correlation.

**IE 4623/6623. Engineering Statistics II. (4)** (Prerequisite: Grade of C or better in IE 4613). Three hours lecture. Continuation of IE 4613/6613. Introduction to engineering applications of regression, experimental design and analysis, and nonparametric methods.

**IE 4653/6653. Industrial Quality Control I. (3)** (Prerequisite: IE 4613). Three hours lecture. The theory and application of statistical quality control: statistical process control and statistical acceptance sampling.

**IE 4673/6673. Reliability Engineering. (3)** (Prerequisites: IE 4613 and MA 3253). Three hours lecture. Probability functions and statistical methods for component life testing and system reliability prediction. System availability and maintainability. Redundancy in time-dependent and time-independent situations.

**IE 4713/6713. Operations Research I. (3)** (Prerequisites: CSE 1213 and IE 4613). Mathematical techniques of decision making, queuing, networks, simulation and dynamic programming.

**IE 4733/6733. Linear Programming I. (3)** (Prerequisites: CSE 1213 and MA 3113). General theory of linear programming and its application; the simplex algorithm, revised simplex algorithm, duality, sensitivity transportation algorithm, assignment algorithm network analysis, and goal programming. (Same as MA 4733/6733).

**IE 4753/6753. Systems Engineering and Analysis. (3)** (Prerequisite: IE 4613). Three hours lecture. Systems concepts, methodologies, models, and tools for analyzing, designing, and improving new and existing human-made systems.

**IE 4773/6773. Systems Simulation I. (3)** (Prerequisites: CSE 1233 or equivalent and grade of C or better in IE 4613). Three hours lecture. Introduction to mathematical techniques of queuing and the principles of stochastic simulation. The statistics of simulation. Use of C programming and special purpose simulation languages.

**IE 4915/6915. Design of Industrial Systems. (5)** (Prerequisites: Grade of C or better in the following courses : IE 3124, IE 3323, and IE 4333). Two hours lecture. Eight hours laboratory. The fundamental procedures and techniques in design of operational systems. Emphasis on both sub-systems and total systems.

**IE 4934/6934. Information Systems for Industrial Engineering. (4)** (Corequisite: IE 1911). Three hours lecture. Three hours laboratory. An introduction to the design and development of information systems for use in industrial engineering applications.

**IE 4990/6990. Special Topics in Industrial Engineering. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**IE 7000. Directed Individual Study.** Hours and credits to be arranged.

**IE 8000. Thesis Research/Thesis.** Hours and credits to be arranged.

**IE 8153. Cognitive Engineering. (3)** Three hours lecture. Implications of human perceptual, cognitive, and psycho-motor capabilities on the design of systems for effective, efficient and safe human-machine performance.

**IE 8333. Production Control Systems II. (3)** (Prerequisites: IE 4333 and consent of instructor). Three hours lecture. Inventory systems, static and dynamic production planning, operations scheduling and forecasting systems.

**IE 8343. Artificial Intelligence in Manufacturing. (3)** (Prerequisite: Computer programming ability and consent of instructor). Three hours lecture. Introduction to artificial intelligence techniques used in manufacturing. Topics include the application of expert systems, neural networks, machine learning, and discussion of current research.

**IE 8353. Manufacturing Systems Modeling. (3)** (Prerequisites: IE 4733 and IE 4773). Three hours lecture. A study of models used to de-

scribe and analyze manufacturing systems. Development of models using queuing networks, mathematical programming, simulation, and other techniques.

**IE 8373. Computer Integrated Manufacturing. (3)** (Consent of instructor). Three hours lecture. An investigation of computer integrated manufacturing and the technologies that support its implementation.

**IE 8583. Enterprise Systems Engineering. (3)** (Prerequisite: Consent of Instructor). Three hours lecture. Focuses on the design and improvement of an enterprise through the use of engineering tools and methods, based on the systems perspective of industrial engineering.

**IE 8713. Mechanics and Control of Manufacturing Systems. (3)** Three hours lecture. Design and operation of computer controlled machine tools. Kinematics and control of robot manipulators. Industrial applications of robots. (Same as ME 8713).

**IE 8723. Operations Research II. (3)** (Prerequisite: IE 4713). Problem formulation, general inventory theory, restricted inventory models. Markovian and queuing processes, sequencing and coordination, game theory, search problems.

**IE 8733. Decision Theory. (3)** (Prerequisite: IE 4613). Three hours lecture. A quantitative development of the decision making process. Criteria for decision making. Treatment of risk under uncertainty and in conflict situations.

**IE 8743. Nonlinear Programming I. (3)** (Prerequisite: IE 4733 or MA 4733). Three hours lecture. Optimization of nonlinear functions; quadratic programming, gradient methods, integer programming; Lagrange multipliers and Kuhn-Tucker theory.

**IE 8753. Dynamic Programming. (3)** (Prerequisites: MA 2733 and IE 4613). Three hours lecture. Study of serial and nonserial multistage systems—both deterministic and stochastic. Principles of optimality. Application of dynamic programming to industrial and management problems.

**IE 8773. Systems Simulation II. (3)** (Prerequisite: IE 4773/6773). Three hours lecture. Continuation of IE 4773/6773. Includes: Advanced theory and practice of simulation. The statistics of simulation. Simulation languages. Continuous simulations.

**IE 8783. Neural Networks in Optimization. (3)** (Prerequisites: IE 4733/6733). Three hours lecture. A study of neural network models and their applications to optimization problems.

**IE 8913. Engineering Economy II. (3)** (Prerequisites: IE 3913 and IE 4713). Three hours lecture. Advanced principles and methods for engineering analysis of industrial problems. Topics include criteria for decisions, project investment and analysis, and elements of risk and uncertainty.

**IE 8990. Special Topics in Industrial Engineering. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**IE 9000. Dissertation Research/Dissertation.** Hours and credits to be arranged.

## INSURANCE, RISK MANAGEMENT, and FINANCIAL PLANNING

Office: 326 McCool Hall  
(For departmental information, see FINANCE and ECONOMICS.)

**INS 3413. Introduction to Personal Financial Planning. (3)** (Cross listed with FIN 3003). Three hours lecture. The individual's acquisition and management of an optimal personal income and expenditure pattern over a lifetime to best meet his/her financial objectives. (Not open to finance majors or as part of GBA Finance Concentration).

**INS 2990. Special Topics in Insurance. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**INS 3103. Principles of Insurance. (3)** (Prerequisite: Junior standing). Three hours lecture. A study of the principles and concepts of insurance plus a survey of personal coverages such as Homeowners, Automobile, Life and Health insurance.

**INS 3203. Property and Casualty Insurance. (3)** Three hours lecture. A study of the major issues in property and casualty insurance including property and liability coverages, company operations, rate making, and international concepts.

**INS 3303. Life and Health Insurance. (3)** Three hours lecture. The nature and function of life insurance; policy forms and provisions; reserves; company organization; legal aspects; taxation and practical application.

**INS 3403. Financial Planning. (3)** (Prerequisites: FIN 3123, and INS 3103, INS 3303 or consent of instructor). Three hours lecture. A study dealing with the problems of the individual in the creating, conserving, and disposing of an estate through the use of property, securities, and insurance.

**INS 3503. Employee Benefits. (3)** Three hours lecture. A comprehensive study of employee benefit plans available to employers, including the principles and concepts necessary to design and implement successful employee benefit programs.

**INS 4000. Directed Individual Study. (1-3)** Hours and Credits to be arranged with instructor.

**INS 4503/6503. Enterprise Risk Management. (3)** (Prerequisites: FIN 3123, MGT 3114, MKT 3013, or consent of instructor.) Three hours lecture. A study of the principles, concepts and techniques to manage pure risk exposures which organizations face while pursuing their objectives.

**INS 4990/6990. Special Topics in Insurance. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

## INTERNATIONAL STUDENT EXCHANGE

Office: 608 Allen Hall

**ISE 4100-4200. International Student Exchange.** (Prerequisite: Acceptance into the International Student Exchange Program). Grades from the host institution will be transferred and recorded at MSU after each semester the student participates in the program.

**ISE 6100-6200. International Student Exchange.** (Prerequisite: Acceptance into the International Student Exchange Program). Grades from the host institution will be transferred and recorded at MSU after each semester the student participates in the program.

## Department of LANDSCAPE ARCHITECTURE

Office: Landscape Architecture Facility

Professors Man (Head), and Melby ;  
Professors Emeritus Bishop and Martin;  
Associate Professors Clark, and Cook;

Assistant Professors Brzuszek, Milburn, Mulley, Ray, Walker and Wilkerson

**LA 1153. Introduction to Landscape Architecture. (3)** Six hours studio/lab. Acquaints students with the profession's design vocabulary, application, types of work, and initial experiences dealing with the creation of and evaluation of three dimensional space.

**LA 1172. Freshman Seminar Landscape Architecture. (2)** Two hours seminar. An introduction to the profession of landscape architecture including professional opportunities and an overview of the body of the knowledge.

**LA 1223. Use of Computers in Landscape Architecture. (3)** One hour lecture. Four hours studio/lab. A review of computer technology and its application to the practice of Landscape Architecture.

**LA 1253. Design Fundamentals in Landscape Architecture. (3)** One hour lecture. Six hours studio/lab. The investigation and application of problem solving techniques, learning of basic drawing fundamentals, and exploration of the nature of creativity associated to landscape architecture issues.

**LA 1701. Introduction to Landscape Contracting. (1)** Two hours laboratory. A survey of the construction industry with emphasis on landscape contracting and the roles of principals involved. Opportunities in the landscape industry.

**LA 1712. Landscape Contracting Internship I. (2)** (Prerequisites: LA 1701; completion of 12 hours; 2.0 GPA). Internship of planned,

progressive and supervised experiential learning with a landscape contracting firm.

**LA 1803. Landscape Architecture Appreciation. (3)** Three hours lecture. A survey of landscape architecture encompassing design, construction, management, maintenance and practice. Emphasis on development and improvement of home, neighborhood and community environment. (For non-majors.)

**LA 2323. Presentation Methods and Media. (3)** (Prerequisite: None; recommended: ART 1123 & ART 1213). Six hours studio/lab. Delineation and professional presentation techniques for the practice of Landscape Architecture utilizing traditional and contemporary presentation approaches.

**LA 2334. Plant Specifications For Small Properties. (4)** (Prerequisite: PSS 3473). One hour lecture. Six hours studio. Plant selection, design and specifications for small properties in response to environmental conditions and user needs.

**LA 2423. History of Landscape Architecture. (3)** Three hours lecture. Historic developments of Landscape Architecture Profession.

**LA 2433. Landscape Systems and Plant Communities. (3)** One hour lecture. Four hours laboratory. The nature, scope and relevancy of landscape systems and their respective plant communities as they relate to land planning and landscape architectural design.

**LA 2453. Site Inventory and Analysis. (3)** One hour lecture. Four hours studio/lab. The collection, presentation, and use of pertinent site related data. Conventional non-technical methods of presentation of data and computer generated formats are considered and analyzed.

**LA 2701. Landscaped Contracting Seminar I. (1)** (Prerequisite: LA 1712). One hour lecture. Weekly seminar to investigate topics related to modern landscape practices experienced in LA 1712 LC Internship I. Formal presentations of internship case studies.

**LA 2712. Landscape Contracting Internship II. (2)** (Prerequisites: LA 1712, LA 2701, and 2.00 GPA). Internship of planned, progressive and supervised experiential learning with a landscape contracting firm.

**LA 2990. Special Topics in Landscape Architecture. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**LA 3544. Landscape Architecture Construction I. (4)** (Prerequisite: none; Recommended: ABE 2873 & MA 1323). Two hours lecture. Four hours studio/lab. Course is concerned with land surveying, landscape architecture grading, road alignments and calculations for cut and fill volumes.

**LA 3555. Landscape Architecture Design Studio I. (5)** (Prerequisites: LA 1153, LA 1253, LA 1223, LA 2323, & LA 2453). Two hours lecture. Six hours studio/lab. A landscape architectural design process applied to site planning for small acreages. Emphasis on accommodation and application of design principles to site design elements.

**LA 3603. Design of the Golf Environment. (3)** (Prerequisite: LA 1803). Three hours lecture. Defining site development concerns of a golf complex, addressing areas of history, design, construction and maintenance.

**LA 3623. Urban Planning Theory. (3)** Three hours lecture. Open to majors and non-majors. Survey of principles and practice of urban planning. Emphasis on the planning process and use of a city's police power to regulate use of land.

**LA 3644. Landscape Architecture Construction II. (4)** (Prerequisite: none; Recommended: LA 3544). Two hours lecture. Four hours studio/lab. Calculations for storm-water management, best management practices, surface and subsurface drainage systems, basic hydrology and erosion and sediment control design and practices.

**LA 3652. Case Studies of Executed Works in Landscape Architecture. (2)** (Prerequisite: LA 3655). Special five to ten day on-site observation visit for the study of notable LA projects and construction methods with lectures.

**LA 3655. Landscape Architecture Design Studio II (5)** (Prerequisites: LA 1153, LA 1253, LA 1223, LA 2323 & LA 2453). Two hours lecture. Six hours studio/lab. Deals with program and site specific requirements, inventory and analysis, construction detailing, economic issues, social impact, and planting design applied to medium scale projects.

**LA 3701. Landscape Contracting Seminar II. (1)** (Prerequisite: LA 2712). One hour lecture. Weekly seminar to investigate topics related to modern landscape practices experienced in LA 2712 LC Internship II. Formal presentations of internship case studies.

**LA 3712. Landscaping Contracting Internship III. (2)** (Prerequisites: LA 2712, LA 3701, and 2.00 GPA). Internship of planned, progressive and supervised experiential learning with a landscape contracting firm.

**LA 3713. Landscape Contracting I. (3)** (Prerequisites: ABE 1073 and EG 1513). Two hours lecture. Two hours laboratory. Study of the nature, scope, and application of the varied construction materials used in landscape projects; and, the construction processes related to landscape development.

**LA 3721. Landscape Contracting Field Trip I. (1)** (Prerequisite: LA 1701). Five to ten day trip to visit landscape contracting firms and observe completed works.

**LA 3742. Landscape Architecture Internship. (2)** (Prerequisite: Satisfactory completion of semester six of B.L.A. program with an overall G.P.A. of 3.0 in the Junior Year). Supervised experiential learning with a professional office or public agency.

**LA 4000. Directed Individual Study.** Hours and credits to be arranged.

**LA 4344. Landscape Architecture Construction IV. (4)** (Prerequisites: LA 3274 or consent of instructor). Two hours lecture. Four hours laboratory. Preparation of landscape architectural construction plans, details, and specifications for outdoor lighting, for irrigation, and for septic systems.

**LA 4701. Landscape Contracting Seminar III. (1)** (Prerequisite: LA 3712). One hour lecture. Weekly seminar to investigate topics related to modern landscape practices experienced in LA 3712 LC Internship III. Formal presentations of internship case studies.

**LA 4721. Landscape Contracting Field Trip II. (1)** (Prerequisite: LA 3721). Five to ten day trip to visit with landscape contracting firms and observe completed works.

**LA 4723. Professional Practice of Landscape Architecture. (3)** Three hours lecture. Office management, contracting, budgeting, design proposals, supervision of construction contracts, professional liability, and professional ethics.

**LA 4724. Landscape Contracting II. (3)** (Prerequisites: LA 3713 or LA 4334). Two hours lecture. Four hours laboratory. Analysis of legal, financial, and management aspects of landscape contracts; and quantity surveying, cost estimation, and critical path management of landscape construction projects.

**LA 4733. Landscape Contracting III. (3)** (Prerequisites: LA 4724, ACC 2013, and MGT 3114). Two hours lecture. Two hours laboratory. Theory and practice of managing a Landscape Construction Firm. Case studies of contemporary issues.

**LA 4744. Landscape Contracting IV. (4)** (Prerequisite: LA 4724 and PSS 4414). Two hours lecture. Two hours laboratory. Application levels studies of post-construction management practices of landscape projects.

**LA 4755. Landscape Architecture Design Studio III. (5)** (Prerequisites: LA 1153, LA 1253, LA 1223, LA 2323 & LA 2453). Two hours lecture. Six hours studio/lab. The design process applied to intermediate size project, with emphasis on providing shelter for society. Integration of techniques for design development into a holistic process.

**LA 4844. Design of Sustainable Communities. (4)** (Prerequisite: none; Recommended: MA 1313 and MA 1323). Three hours lecture. Two hours studio/lab. Nature of materials used in landscape architecture, their physical attributes and liabilities that contribute to their use in a safe and healthy manner.

**LA 4855. Landscape Architecture Capstone Studio. (5)** (Prerequisites: LA 3555, LA 3655, LA 4755, LA 3544, LA 3644, LA 4723). Twelve hours studio/lab. A self-directed course that includes an approved terminal project including proposal, analytical design process, master plan, support drawings, and construction documents of selected plan elements.

**LA 4990/6990. Special Topics in Landscape Architecture. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**LA 5544. Golf Course Architecture I. (4)** (Prerequisite: LA 4445 and PSS 4414). One hour lecture. Six hours studio. Comprehensive studies of golf course architecture, including analysis, design, irrigation, construction detailing, cost analysis, and management concerns.

**LA 7000. Directed Individual Study.** Hours and credit to be arranged.

**LA 8000. Thesis Research/Thesis.** Hours and credit to be arranged.

**LA 8512. Landscape Architecture Graduate Studio I. (2)** (Prerequisite: admission to the Master of Landscape Architecture). Four hours studio. Emphasis on holistic approaches to sustainable watershed planning and management. Course deals specifically with prevention of destruction of habitat, biological stress, and hydrologic changes.

**LA 8522. Landscape Architecture Graduate Studio II. (2)** (Prerequisite: admission to the Master of Landscape Architecture). Four hours studio. Application of spatial analytical techniques and Geo-

graphic Information Systems to the execution of landscape planning problems in the Mississippi region.

**LA 8532. Landscape Architecture Graduate Studio III. (2)** (Prerequisite: second year standing in the Master of Landscape Architecture). Four hours studio. Emphasis on community based planning and design, including consideration of natural resource planning, main street revitalization, open space planning, community design, and small town planning.

**LA 8711. Seminar in Watershed Planning and Management. (1)** (Prerequisite: admission to the Master of Landscape Architecture program or consent of the instructor). One hour seminar. Examination of major elements of watershed planning and management pertinent to landscape architecture, with particular emphasis on emerging trends in the field.

**LA 8721. Seminar in Landscape Management. (1)** (Prerequisite: admission to the Master of Landscape Architecture program or consent of the instructor). One hour seminar. Examination of major elements of landscape management pertinent to landscape architecture, with particular emphasis on emerging trends in the field.

## THE LEARNING CENTER

Office: 267 Allen Hall

**LSK 0003. Developmental Reading. (3)** Three hours lecture. Emphasizes and develops basic reading skills. Offered to students required to enroll in development studies. Credit received for this course will not be applicable toward any degree.

**LSK 0023. Developmental Studies Laboratory. (3)** Six hours laboratory. Computer tutorials and study skills for intermediate algebra, basic English and effective reading. Designed especially for students who have attended the Summer Developmental Program.

**LSK 0103. Intermediate Reading. (3)** (Prerequisite: Score of 15 to 19 on the reading section of the ACT.) Three hours lecture. Emphasizes and develops intermediate reading skills, including comprehension, vocabulary development, and reading rate. Credit received for this course will not be applicable toward any degree.

**LSK 1001. Freshman Seminar. (1)** One hour seminar. Multi-disciplined, campus-wide approach to orientation to the university, and strategies for employing personal and university resources.

**LSK 1011. Study Skills for College. (1)** Development of study principles and skills needed for college.

**LA 8731. Seminar in Community Based Planning. (1)** (Prerequisite: second year standing in the Master of Landscape Architecture program or consent of the instructor). One hour seminar. Examination of major elements of community based planning pertinent to landscape architecture, with particular emphasis on emerging trends in the field.

**LA 8741. Seminar in Landscape Architecture Thesis. (1)** (Prerequisite: second year standing in the Master of Landscape Architecture program or consent of the instructor). One hour seminar. Preparation of a detailed proposal, selection of the students's thesis committee, and submission of the proposal to the Graduate Studies Committee for review and approval.

**LA 8990. Special Topics in Landscape Architecture. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years.)

**LSK 1013. Effective Reading. (3)** (Designed to prepare a student to comprehend college level reading materials; does not count toward a degree.) Three hours lecture. Comprehension and vocabulary improvement through the use of computer-aided-instruction and directed group activities.

**LSK 1023. College Reading and Study Skills. (3)** Three hours lecture. Development of reading and study skills needed for college.

**LSK 2013. Speed Reading. (3)** Three hours lecture per week. Development of techniques for increasing rate of comprehension for all types of reading material.

**LSK 2990. Special Topics in Learning Skills. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

**LSK 6990. Special Topics in Learning Skills. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years)

## Department of MATHEMATICS and STATISTICS

Office: 410 Allen Hall

Professors Neumann (Interim Head), Razzaghi, Reed, Shivaji, and Xu;

Associate Professors Aktosum, Dang, DuBien, Gerard, Johnson, L. Miller, V. Miller, Oppenheimer, Pearson, Qian and Smith;

Assistant Professors Dobson, Fabel, Harvill, Jonkman, Knudson, Okhuysen, Sarkissian, B. Scarborough and Wu;

Instructor Daniels

Students who have credit for one or more upper division mathematics courses will not receive repeat credit for a mathematics course numbered below MA 2000. Students who have credit for MA 1713 are not permitted to enroll in any mathematics course numbered below MA 1713 without departmental approval.

**MA 0003. Developmental Mathematics. (3)** (MA 0003 is a developmental course designed to prepare a student for university mathematics courses at the level of MA 1313 College Algebra: credit received for this course will not be applicable toward a degree). Three hours lecture. Real numbers fractions, decimal fractions, percent, algebraic expressions, factoring, algebraic fractions, linear equations/inequalities, integral exponents, quadratic equations.

**MA 0103. Intermediate Algebra. (3)** (MA 0103 is designed to prepare a student for MA 1313 College Algebra) Three hours lecture. Real numbers, algebraic expressions, factoring, algebraic fractions, linear equations/inequalities, quadratic equations, Pythagorean Theorem. Does not count toward any degree.

**MA 1303. Quantitative Reasoning. (3)** (Prerequisites: ACT Math subscore 20, or grade of C or better in MA 0103. High School Credit in Algebra I, Algebra II, and Geometry, or equivalent. MA 1303 is a general education core alternative to MA 1313; credit may be earned for both MA 1303 and MA 1313 but the completion of same will not satisfy the MSU core requirement of "three hours of mathematics beyond the level of College Algebra".) Three hours lecture. Descriptive statistics, normal and binomial distributions sampling, probability, hypotheses testing; logical statements and arguments; graphical solution of systems of equations/inequalities; estimation and approximation.

**MA 1313. College Algebra. (3)** (Students with credit in MA 1713 will not receive credit for this course. Prerequisite: ACT Math subscore 20, or grade of C or better in MA 0103). Three hours lecture. Review of fundamentals; linear and quadratic equations; inequalities; functions; simultaneous equations; topics in the theory of equations.

**MA 1323. Trigonometry. (3)** (Students with credit in MA 1713 will not receive credit for this course. Prerequisite: ACT Math subscore 24, or grade of C or better in MA 1313). Three hours lecture. The trigonometric functions: identities; trigonometric equations: applications.

**MA 1413. Structure of the Real Number System. (3)** (Prerequisite: a C or better in MA 1313 or an ACT Math sub-score of 24). Three hours lecture. The nature of mathematics; introductory logic; structure and development of the real number system. (For Elementary and Special Education majors only).

**MA 1423. Problem Solving with Real Numbers. (3)** (Prerequisite: a C or better in MA 1413). Three hours lecture. Proportions, percent problems, probability, counting principles, statistics. (For Elementary or Special Education majors only).

**MA 1433. Informal Geometry and Measurement. (3)** (Prerequisites: a C or better in both MA 1413 and MA 1423). Three hours lecture. Measurements and informal geometry. (For Elementary and Special Education majors only).

**MA 1453. Precalculus with Graphing Calculators. (3)** (Prerequisites: Math ACT 22 or C or better in MA 1313). Three hours lecture. Properties, applications, and graphs of linear, quadratic, polynomial, exponential, logarithmic, and trigonometric functions; trigonometric identities, equations and inverses; inequalities; conic sections; polar and parametric equations. (Degree credit will not be granted for MA 1453 and either MA 1313 or MA 1323. This course is intended to prepare students to take MA 1713 Calculus I).

**MA 1463. Finite Mathematics and Introduction to Calculus. (3)** (Prerequisite: ACT Math subscore 24, or grade of C or better in MA 1313). Three hours lecture. Matrices and systems of linear equations; introduction to calculus.

**MA 1613. Calculus for Business and Life Sciences I. (3)** (Prerequisite: ACT Math subscore 24, or grade of C or better in MA 1313). Three hours lecture. Algebraic and some transcendental functions, solu-

tions of systems of linear equations, limits, continuity, derivatives, applications.

**MA 1623. Calculus for Business and Life Sciences II. (3)** (Prerequisite: MA 1613). Three hours lecture. Antiderivatives, the definite integral, applications of the definite integral, functions of two or more variables, partial derivatives, maxima and minima, applications.

**MA 1713. Calculus I. (3)** (Prerequisite: ACT Math subscore 26, or grade of C or better in MA 1323 or MA 1453). Three hours lecture. Analytic geometry; functions; limits; continuity; derivatives of algebraic functions and trigonometric functions; applications of the derivative. Honors section available through invitation.

**MA 1723. Calculus II. (3)** (Prerequisite: Grade of C or better in MA 1713). Three hours lecture. Antidifferentiation; the definite integral; applications of the definite integral; differentiation and integration of transcendental functions. Honors section available through invitation.

**MA 2733. Calculus III. (3)** (Prerequisite: Grade of C or better in MA 1723). Three hours lecture. Further methods of integration; polar coordinates; vectors; infinite series. Honors section available through invitation.

**MA 2743. Calculus IV (3)** (Prerequisite: Grade of C or better in MA 2733). Three hours lecture. Differential calculus of functions of several variables; multiple integration; vector calculus. Honors section available through invitation.

**MA 2990. Special Topics in Mathematics. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MA 3053. Foundations of Mathematics. (3)** (Prerequisite: MA 1723). Three hours lecture. The logical structure of mathematics; the nature of a mathematical proof; applications to the basic principles of algebra and calculus.

**MA 3113. Introduction to Linear Algebra. (3)** (Prerequisite: MA 1723). Three hours lecture. Vector spaces; matrices; linear transformations; systems of linear equations; characteristic values and characteristic vectors.

**MA 3163. Introduction to Modern Algebra. (3)** (Prerequisite: MA 3113). Three hours lecture. Rings, integral domains, and fields with special emphasis on the integers, rational numbers, real numbers and complex numbers; theory of polynomials.

**MA 3213. Mathematical Writing. (3)** (Prerequisites: MA 3163 or coregistration in MA 3163 and either junior/senior standing in mathematics or consent of instructor.) Three hours lecture. Refinement of specialized writing skills needed for effective communication in the mathematical sciences.

**MA 3253. Differential Equations I. (3)** (Prerequisite: MA 2743 or coregistration in MA 2743). Origin and solution of differential equations; series solutions; Laplace Transform methods; applications.

**MA 3353. Differential Equations II. (3)** (Prerequisite: MA 3253). Three hours lecture. Systems of differential equations; matrix representations; infinite series solution of ordinary differential equations; selected special functions; boundary-value problems; orthogonal functions: Fourier series.

**MA 3463. Foundations of Geometry. (3)** (Prerequisite: MA 1723). Three hours lecture. The structural nature of geometry; modern methods in geometry: finite geometrics.

**MA 3513. History of Mathematics. (3)** (Prerequisite: MA 2733 or coregistration in MA 2733). Three hours lecture. A historical development of mathematicians and their most important contributions will be emphasized.

**MA 4000. Directed Individual Study.** Hours and credits to be arranged.

**MA 4133/6133. Discrete Mathematics. (3)** (Prerequisites: MA 3163 or consent of instructor). Three hours lecture. Sets, relations, functions, combinatorics, review of group and ring theory, Burnside's theorem, Polya's counting theory, group codes, finite fields, cyclic codes, and error-correcting codes.

**MA 4143/6143. Graph Theory. (3)** (Prerequisites: MA 3113 or consent of instructor). Three hours lecture. Basic concepts, graphs, and matrices, algebraic graph theory, planarity and nonplanarity, Hamiltonian graphs, digraphs, network flows, and applications.

**MA 4153/6153. Matrices and Linear Algebra. (3)** (Prerequisites: MA 3113 and MA 3253). Three hours lecture. Linear transformations and matrices; eigenvalues and similarity transformations; linear functionals, bilinear and quadratic forms; orthogonal and unitary transformations; normal matrices; applications of linear algebra.

**MA 4163/6163. Group Theory. (3)** (Prerequisite: MA 3163 or consent of the instructor). Three hours lecture. Elementary properties: normal subgroups; factor groups; homomorphisms and isomorphisms; Abelian groups; Sylow theorems; composition series; solvable groups.

**MA 4173/6173. Number Theory. (3)** (Prerequisite: MA 3113). Three hours lecture. Divisibility: congruences; quadratic reciprocity; Diophantine equations; continued fractions.

**MA 4313/6313. Numerical Analysis I. (3)** (Prerequisites: CSE 1213 or equivalent, MA 3113, and MA 2743). Three hours lecture. Matrix operations; error analysis; norms of vectors and matrices; transformations; matrix functions; numerical solutions of systems of linear equations; stability; matrix inversion; eigen value problems; approximations. (Same as CSE 4313/6313).

**MA 4323/6323. Numerical Analysis II. (3)** (Prerequisites: CSE 1213 or equivalent, MA 3113 and MA 3253). Three hours lecture. Numerical solution of equations; error analysis; finite difference methods; numerical differentiation and integration; series expansions; difference equations; numerical solution of differential equations. (Same as CSE 4323/6323).

**MA 4373/6373. Introduction to Partial Differential Equations. (3)** (Prerequisite: MA 3253). Three hours lecture. Linear operators: linear first order equations; the wave equation; Green's function and Sturm—Liouville problems; Fourier series; the heat equation; Laplace's equation.

**MA 4513/6513. Applied Probability and Statistics for Secondary Teachers. (3)** (Prerequisite: MA 1723). Three hours lecture. (Credit not available for students with credit in MA-ST 4543/6543). Graphical methods of presenting data; analysis of data; probability, binomial distribution, normal distribution; random sampling; linear regression and correlation.

**MA 4523/6523. Introduction to Probability. (3)** (Prerequisite: MA 2733). Three hours lecture. Basic concepts of probability, conditional probability, independence, random variables, discrete and continuous probability distributions, moment generating function, moments, special distributions, central limit theorem. (Same as ST 4523/6523).

**MA 4533/6533. Introductory Probability and Random Processes. (3)** (Prerequisites: MA 3113 and MA 2743). Three hours lecture. Probability, law of large numbers, central limit theorem, sampling distributions, confidence intervals, hypothesis testing, linear regression, random processes, correlation functions, frequency and time domain analysis. (Credit can not be earned for this course and MA/ST 4523/6523.)

**MA 4543/6543. Introduction to Mathematical Statistics I. (3)** (Prerequisite: MA 2743.) Three hours lecture. Combinatorics; probability, random variables, discrete and continuous distributions, generating functions, moments, special distributions, multivariate distributions, independence, distributions of functions of random variables. (Same as ST 4543/6543.)

**MA 4553/6553. Foundations of Analysis For Secondary School Teachers. (3)** (Prerequisite: Consent of instructor). Three hours lecture. Elementary set theory; the real numbers as a complete ordered field; mathematical induction; introduction to metric spaces; convergence theorems.

**MA 4563/6563. Theory of Equations for Secondary School Teachers. (3)** (Prerequisite: MA 1723). Three hours lecture. Complex numbers; polynomials and their properties; roots of algebraic equations; systems of linear equations; determinants and matrices.

**MA 4573/6573. Introduction to Mathematical Statistics II. (3)** (Prerequisite: MA 4543/6543.) Three hours lecture. Continuation of MA-ST 4543/6543. Transformations, sampling distributions, limiting distributions, point estimation, interval estimation, hypothesis testing, likelihood ratio tests, analysis of variance, regression, chi-square tests. (Same as ST 4573/6573.)

**MA 4633/6633. Advanced Calculus I. (3)** (Prerequisite: MA 2743). Three hours lecture. Theoretical investigation of functions; limits; differentiability and related topics in calculus.

**MA 4643/6643. Advanced Calculus II. (3)** (Prerequisite: MA 4633/6633). Three hours lecture. Rigorous development of the definite integral; sequences and series of functions; convergence criteria; improper integrals.

**MA 4733/6733. Linear Programming I. (3)** (Prerequisites: CSE 1213 and MA 3113). General theory of linear programming and its application: simplex algorithm, revised simplex algorithm, duality, sensitivity transportation algorithm, assignment algorithm, network analysis and goal programming. (Same as IE 4733/6733 and CSE 4013/6013).

**MA 4753/6753. Applied Complex Variables. (3)** (Prerequisite: MA 2743). Three hours lecture. Analytic functions: Taylor and Laurent expansions; Cauchy theorems and integrals; residues; contour integration; introduction to conformal mapping.

**MA 4990/6990. Special Topics in Mathematics. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MA 4933/6933. Mathematical Analysis I. (3)** (Prerequisite: MA 4633/6633 or equivalent). Three hours lecture. Metric and topological spaces; functions of bounded variation and differentiability in normed spaces.

**MA 4943/6943. Mathematical Analysis II. (3)** (Prerequisite: MA 4933/6933). Three hours lecture. Riemann-Stieltjes integration, sequences and series of functions; implicit function theorem; multiple integration.

**MA 7000. Directed Individual Study.** Hours and credits to be arranged.

**MA 8000. Thesis Research/Thesis.** Hours and credits to be arranged.

**MA 8113. Modern Higher Algebra I. (3)** (Prerequisite: MA 4163/6163). Three hours lecture. A study of the basic mathematical systems with emphasis on rings, fields, and vector spaces.

**MA 8123. Modern Higher Algebra II. (3)** (Prerequisite: MA 8113). Three hours lecture. A continuation of the topics introduced in MA 8113.

**MA 8203. Foundations of Applied Mathematics I. (3)** (Prerequisites: MA 3113, MA 3253 or consent of instructor.) Three hours lecture. Principles of applied mathematics including topics from perturbation theory, calculus of variations, and partial differential equations. Emphasis of applications from heat transfer, mechanics, fluids.

**MA 8213. Foundations of Applied Mathematics II. (3)** (Prerequisite: MA 8203). Three hours lecture. A continuation of MA 8203 including topics from wave propagation, stability, and similarity methods

**MA 8253. Operational Mathematics. (3)** (Prerequisite: MA 4753/6753). Three hours lecture. Theory and applications of Laplace, Fourier, and other integral transformations: introduction to the theory of generalized functions.

**Courses numbered MA 8273, 8283, 8293 and 8313 have as prerequisites at least one of the courses MA 4633/6633, MA 4153/6153, 4353/6353, 4753/6753.**

**MA 8273. Special Functions. (3)** Three hours lecture. Infinite products: asymptotic series; origin and properties of the special functions of mathematical physics.

**MA 8283. Calculus of Variations. (3)** Three hours lecture. Functionals: weak and strong extrema; necessary conditions for extrema; sufficient conditions for extrema; constrained extrema; direct methods; applications.

**MA 8293. Integral Equations. (3)** Three hours lecture. Equations of Fredholm type: symmetric kernels; Hilbert-Schmidt theory; singular integral equations; applications; selected topics.

**MA 8313. Ordinary Differential Equations I. (3)** Three hours lecture. Linear systems of differential equations; existence and uniqueness; second order systems; systems with constant coefficients; periodic systems; matrix comparison theorems; applications and selected topics.

**MA 8323. Ordinary Differential Equations II. (3)** (Prerequisite: MA 8313). Three hours lecture. Existence, uniqueness, continuation of solutions of nonlinear systems; properties of solutions of linear and nonlinear equations including boundedness, oscillation, asymptotic behavior, stability, and periodicity; application.

**MA 8333. Partial Differential Equations I. (3)** (Prerequisite: MA 4373/6373 or consent of instructor). Three hours lecture. Solution techniques; existence and uniqueness of solutions to elliptic, parabolic, and hyperbolic equations; Green's functions.

**MA 8343. Partial Differential Equations II. (3)** (Prerequisite: MA 8333). Three hours lecture. A continuation of the topics introduced in MA 8333.

**MA 8363. Numerical Solution of Systems of Nonlinear Equations. (3)** (Prerequisites: MA 4313/6313 and MA 4323/6323). Three hours lecture. Basic concepts in the numerical solution of systems of nonlinear equations with applications to unconstrained optimization.

**MA 8383. Numerical Solution of Ordinary Differential Equations I. (3)** (Prerequisites: MA 4313/6313 and MA 4323/6323). Three hours lecture. General single-step, multistep, multivalued, and extrapolation methods for systems of nonlinear equations; convergence; error bounds; error estimates; stability; methods for stiff systems; current literature.

**MA 8393. Numerical Solution of Ordinary Differential Equations II. (3)** (Prerequisite: MA 8383). Three hours lecture. A continuation of topics introduced in MA 8383.

**MA 8443. Numerical Solution of Partial Differential Equations I. (3)** (Prerequisites: MA 4313/6313, MA 4323/6323, and MA 4373/6373 or consent of instructor). Three hours lecture. Basic concepts in the finite difference and finite element methods; methods for parabolic equations; analysis of stability and convergence.

**MA 8453. Numerical Solution of Partial Differential Equations II. (3)** (Prerequisite: MA 8443). Three hours lecture. Methods for elliptic equations; iterative procedures; integral equation methods; methods for hyperbolic equations; stability; dissipation and dispersion.

**MA 8463. Numerical Linear Algebra. (3)** (Prerequisite: MA 4323/6323). Three hours lecture. Basic concepts of numerical linear algebra.

**MA 8473. Advanced Numerical Analysis I. (3)** (Prerequisite: MA 4933/6933). Three hours lecture. Approximation theory. Theoretical aspects of computational mathematics.

**MA 8483. Advanced Numerical Analysis II. (3)** (Prerequisite: MA 8473). Three hours lecture. Approximate solution of linear and nonlinear operator equations.

**MA 8633. Real Analysis I. (3)** (Prerequisite: MA 4943/6943). Three hours lecture. Lebesgue measure and Lebesgue integrals; convergence theorems, differentiation and L spaces.

**MA 8643. Real Analysis II. (3)** (Prerequisite: MA 8633). Three hours lecture. General measures; the Radon-Nikodym theorem and other topics.

**MA 8663. Functional Analysis I. (3)** (Prerequisite: MA 8643). Three hours lecture. Hilbert spaces; Banach spaces; locally convex spaces; Hahn-Banach and closed graph theorems; principle of uniform boundedness; weak topologies.

**MA 8673. Functional Analysis II. (3)** (Prerequisite: MA 8663). Three hours lecture. Continuation of topics introduced in MA 8663.

**MA 8713. Complex Analysis I. (3)** (Prerequisite: MA 4943/6943 or consent of instructor). Three hours lecture. Complex numbers: functions of a complex variable; continuity; differentiation and integration of complex functions; transformations in the complex plane.

**MA 8723. Complex Analysis II. (3)** (Prerequisite: MA 8713). Three hours lecture. Series; analytic continuation; Riemann surfaces; theory of residues.

**MA 8913. Introduction to Topology I. (3)** (Prerequisite: MA 4643/6643 or MA 4953/6953). Three hours lecture. Basic general topology; introduction of homotopy and homology groups.

**MA 8923. Introduction to Topology II. (3)** (Prerequisite: MA 8913). Three hours lecture. Continuation of topics introduced in MA 8913.

**MA 8981. Teaching Seminar. (1)** One hour lecture. Preparation for service as instructors in mathematics and statistics courses; includes practice lectures and exam preparation. (May be taken for credit more than once.)

**MA 8990. Special Topics in Mathematics. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MA 9000. Dissertation Research. (1-6)** Hours and credits to be arranged.

**MA 9163. Selected Topics in Combinatorics. (3)** (Prerequisites: MA 8133 or consent of instructor). (May be taken for credit more than once). Three hours lecture. Continuation of one or more advanced topics introduced in MA 8133.

**MA 9313. Selected Topics in Ordinary Differential Equations. (3)** (Prerequisite: MA 8313 and consent of instructor). (May be taken for credit more than once). Three hours lecture. Topics to be chosen from such areas as Bifurcation Theory, Biological Modeling, Control Theory, Dynamical Systems, Functional Differential Equations, Nonlinear Oscillations, and Quantitative Behavior.

**MA 9333. Selected Topics in Partial Differential Equations. (3)** (Prerequisite: MA 8333 and consent of instructor). (May be taken for credit more than once). Three hours lecture. Topics to be chosen from such areas as Bifurcation Theory, Boundary Integral Methods, Evolution Equations, Maximum and Variational Principles, and Spectral Methods.

**MA 9413. Selected Topics in Numerical Analysis. (3)** (Prerequisite: Consent of instructor). (May be taken for credit more than once). Three hours lecture. Current topics in Numerical Analysis. The subject matter may vary from year to year.

**MA 9633. Selected Topics in Analysis. (3)** (Prerequisite: MA 8643 and consent of instructor). (May be taken for credit more than once). Three hours lecture. Topics will be chosen from areas of analysis of current interest.

**MA 9913. Selected Topics in Algebra. (3)** (Prerequisite: MA 8123 and consent of instructor). (May be taken for credit more than once). Three hours lecture. Topics to be chosen from such areas as valuation theory; polynomial rings; Noetherian, Prüfer, Dedekind, and other domains of classical ideal theory; nonassociative algebraic systems.

## Department of MECHANICAL ENGINEERING

Office: 210 Carpenter Engineering Building

Professors Steele (head), Adebisi, Berry, Hodge, Horstemeyer, Jones, Marcum, and Taylor;

Associate Professors Cain, Chamra, Daniewicz, and Luck;

Assistant Professors James, Mago, Parsons, Patton, Schneider, and Walters;

Instructor Emplainscourt;

**ME 1111. Introduction to Mechanical Engineering. (1)** (Prerequisite: Freshman standing or consent of instructor). One hour lecture. Introduction to the mechanical engineering curriculum, the profession, and career opportunities. Historical perspective; the support role of the department, college, and university; student roles and responsibilities.

**ME 2990. Special Topics in Mechanical Engineering. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**ME 3113. Engineering Analysis. (3)** (Prerequisites: Computer Literacy, MA 3113, MA 3253, and PH 2213). Three hours lecture. Analysis of engineering problems requiring the use of engineering fundamentals and mathematical techniques of analysis with computer applications.

**ME 3313. Heat Transfer. (3)** (Prerequisites: EM 3313, MA 3253, and ME 3533 or ME 3513). Three hours lecture. A study of the fundamental principles of heat transfer; processes; steady and transient conduction in solids; thermal radiation; and convective processes.

**ME 3403. Materials and Manufacturing in Design. (3)** (Prerequisites: CH 1223 and EM 2413, Corequisite EM 3213). Three hours lecture. Behavior, testing and processing of engineering materials. Emphasis is placed on the interrelation of design with processing and material selection.

**ME 3423. Mechanics of Machinery. (3)** (Prerequisites: EM 2433 and ME 3113). Three hours lecture. Analysis of mechanisms for motions, velocities, accelerations, and forces.

**ME 3513. Thermodynamics I. (3)** (Prerequisites: CH 1223, MA 2733, and PH 2213). Three hours lecture. Definitions; properties of a pure substance; work and heat; First and Second Laws; entropy; ideal gases.

**ME 3523. Thermodynamics II. (3)** (Prerequisite: ME 3513). Three hours lecture. Mixtures of ideal gases; irreversibility and availability; vapor power cycles; gas power cycles; refrigeration cycles; flow through nozzles and turbine blades; combustion; chemical equilibrium.

**ME 3533. Thermodynamics. (3)** (Prerequisite: MA 1723). Three hours lecture. Definitions; work and heat; pure substances; fundamental laws; processes; externally reversible cycles; entropy; vapor and gas power cycles; heat transfer.

**ME 3613. System Dynamics. (3)** (Prerequisites: EM 2433, ME 3113, EM 3313, and ECE 3183). Three hours lecture. Mathematical description of mechanical, electrical, hydraulic and pneumatic systems. Transient and frequency response of linear systems.

**ME 3701. Experimental Orientation. (1)** (Prerequisites: credit or registration in ME 3523 and a technical junior level writing course). Three hours laboratory. Measurements: their accuracy and usefulness; reporting; measurements of pressure, temperature, mass, weight, volume, speed, time, frequency, torque, power, area, force, and displacement.

**ME 4000. Directed Individual Study.** Hours and credits to be arranged.

**ME 4223/6223. Mechanical Systems Analysis. (3)** (Prerequisites: EM 3413 or ME 3613 and senior standing). Three hours lecture. Fourier methods, shock spectra, signature analysis, relation to specific phenomena and malfunctions; acoustical aids; field measurement analysis; random functions, correlations; mobility and impedance methods.

**ME 4333/6333. Energy Systems Design. (3)** (Prerequisites: ME 3313 and ME 3113). Three hours lecture. Comprehensive design problems requiring engineering decisions, data acquisition, codes/standards compliance. Emphasis upon energy systems components: heat exchangers, piping networks, pumps. Fluid transients, system modeling.

**ME 4343/6343. Intermediate Heat Transfer. (3)** (Prerequisite: ME 3313). Three hours lecture. Condensation and boiling, analytical and numerical techniques for conduction and convection, gray-body and spectral-dependent radiation, transient and steady-state thermal modeling.

**ME 4353/6353. Alternate Energy Sources. (3)** (Prerequisite: ME 3313). Three hours lecture. Analysis and design of systems using energy derived from solar, hydro, geothermal, wind, ocean, waste, and biomass sources.

**ME 4373/6373. Air Conditioning. (3)** (Prerequisites: ME 3523 and ME 3313). Three hours lecture. Psychometrics; comfort conditions; determination of heat losses and gains; determination of sizes of elements; energy usage estimating; residential and commercial systems.

**ME 4383/6383. Heat Exchanger Design. (3)** (Prerequisites: ME 3313 and EM 3313). Three hours lecture. Thermal design and applica-

tion of various types of heat exchangers including: surface selection, design, sizing, rating, and operational challenges.

**ME 4403. Machine Design. (3)** (Prerequisite: EM 3213). Three hours lecture. Applied stress analysis and material strength theories for sizing and selecting materials of machine elements. Selection of gears, cams, belts, springs. Design projects.

**ME 4413/6413. Casting and Joining. (3)** (Prerequisite: ME 3403 or consent of instructor). Three hours lecture. Fundamentals of solidification in casting and joining processes, including design applications.

**ME 4423/6423. Machining and Forming. (3)** (Prerequisite: ME 3403 or consent of instructor). Three hours lecture. Fundamentals of mechanical processing of metals, including bulk and sheet forming techniques.

**ME 4443/6443. Mechanical Systems Design. (3)** (Prerequisites: ME 3423 and ME 4403). Three hours lecture. Mechanical design projects involving analysis; industrial standards and considerations for safety and manufacturability; the use of computers in design and manufacturing automation ((CAD/CAM).

**ME 4453/6453. Lubrication. (3)** (Prerequisite: Senior standing). Three hours lecture. Friction of solids and fluids. Lubricants. Theory of sliding bearings. Multi-dimensional bearings with constant forces and velocities. Film, hydrodynamic, and gas lubrication. Design of bearings.

**ME 4463/6463. Engineering Design. (3)** (Prerequisites: ME 3613 and Senior standing). Three hours lecture. In-depth topics in mechanical design. Design of friction devices, hydrodynamic drives, and shells of revolution. Design for thermal creep, thermal stresses, surface contact, and impact.

**ME 4473/6473. Kinematic Theory and Design of Mechanisms. (3)** (Prerequisites: ME 3423). Three hours lecture. Advanced kinematic theory of plane mechanisms. Velocity and acceleration analysis, coupler curves, centrodes, precision points, graphical and computer synthesis of 4 bar mechanism.

**ME 4483/6483. Computer-Aided Design. (3)** (Prerequisite: ME 4403). Three hours lecture. Role of computers in design process, CAD tools, design software development, numerical methods, finite elements, design optimization, shape description, presentation of design data, data structures.

**ME 4493/6493. Concurrent Engineering. (3)** (Prerequisite: Junior or Senior standing). Three hours lecture. An introduction to the implementation, application, and management of concurrent engineering, as well as, the tools and techniques that support new product development.

**ME 4543/6543. Combustion Engines. (3)** (Prerequisites: ME 3523 and ME 3313). Three hours lecture. Application of thermodynamics, heat transfer, and combustion in the determination of performance characteristics of various engines, e.g., internal combustion, jet, and rocket engines.

**ME 4623/6623. Control Systems. (3)** (Prerequisite: ME 3613 and ECE 3283). Three hours lecture. Principles of closed loop mechanical, electrical, hydraulic, pneumatic, and thermodynamic systems. Design of control systems.

**ME 4624/6624. Experimental Methods in Materials Research. (4)** (Prerequisites: CHE 3413 or ABE 3813 or ME 3403 or consent of instructor). Three hours lecture. Three hours laboratory. An introduction to research methodologies commonly used in the evaluation of treatments and mechanical testing. (Same as ABE 4624/6624 and CHE 4624/6624).

**ME 4643/6643. Automation of Mechanical Systems. (3)** (Prerequisites: ME 3613 and ECE 3283). Three hours lecture. An introduction to the design of automated equipment and processes. Automation of processes using fluid power equipment and industrial controllers.

**ME 4721. Experimental Techniques I. (1)** (Prerequisites: ME 3701, EM 3313, and credit or registration in ME 3313). Three hours laboratory. Application of principles of experimental design, statistics, uncertainty analysis, instrument response, data acquisition and data reduction to obtain experimental solutions to problems in engineering.

**ME 4731. Experimental Techniques II. (1)** (Prerequisite: ME 4721). Three hours laboratory. Continuation of ME 4721. Plan and use the microcomputer to record data and control experiments in traditional mechanical engineering subject areas. Analyze and report results.

**ME 4823/6823. Compressible Flow and Turbomachinery. (3)** (Prerequisites: EM 3313 and ME 3523). Three hours lecture. Fundamental principles, shock and expansion waves, generalized one-dimensional

flows, simple processes, energy transfer in turbomachines, turbomachine efficiencies, multi-dimensional effects.

**ME 4833/6833. Intermediate Fluid Mechanics. (3)** (Prerequisite: EM 3313). Three hours lecture. Differential equations of fluid mechanics, Newtonian and non-Newtonian fluids, boundary-layer theory, laminar and turbulent solutions, compressible flow with applications.

**ME 4990/6990. Special Topics in Mechanical Engineering. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**ME 7000. Directed Individual Study.** Hours and credits to be arranged.

**ME 8000. Thesis Research/Thesis.** Hours and credits to be arranged.

**ME 8011. Graduate Seminar. (1)** Presentation and discussion of research and current mechanical engineering literature by students, faculty, and visiting lecturers. Attendance required for students in Mechanical Engineering Graduate Program.

**ME 8213. Engineering Analysis I. (3)** Three hours lecture. The formulation of mathematical methods of advanced engineering problems and the use of mathematical techniques for their solution: equilibrium, eigenvalue, and propagation problems.

**ME 8243. Finite Elements in Mechanical Engineering. (3)** (Prerequisites: ME 4403 and EM 3213). Three hours lecture. Concepts and applications of finite element analysis in mechanical engineering problems.

**ME 8253. Fatigue and Fracture in Engineering Design. (3)** Three hours lecture. Stress analysis of cracked components. Prediction and prevention of fatigue failure and fracture.

**ME 8313. Conductive Heat Transfer. (3)** Three hours lecture. Closed form analytical and approximate numerical solutions to one, two, and three dimensional steady-state and transient problems in conduction heat transfer.

**ME 8323. Radiative Heat Transfer. (3)** Three hours lecture. Thermal radiation through non-absorbing and absorbing media; integral equations for radiative transfer; unified method for radiation-exchange calculations; solar terrestrial, and planetary radiation.

**ME 8333. Convective Heat Transfer. (3)** Three hours lecture. Analytical and empirical methods of solution of problems in laminar and turbulent, natural and forced convective heat transfer. Stability; thermal boundary layer techniques; multiphase systems.

**ME 8343. Two-Phase Flow and Heat Transfer. (3)** (Prerequisites: ME 3313 and EM 3313). Three hours lecture. Two-phase fluid mechanics and heat transfer processes in engineering systems. Pool boiling, flow boiling, and convective condensation.

**ME 8363. Computational Heat Transfer. (3)** (Prerequisite: Consent of Instructor). Three hours lecture. Application of numerical tech-

niques to elliptic and parabolic problems in engineering heat transfer and fluid flow. Discretization techniques; linearization; stability analysis. (Same as ASE 8363).

**ME 8403. Principles of Computer-Aided Design and Manufacturing. (3)** Three hours lecture. CAD/CAM principles and tools presented in generic and basic forms; engineering and design applications; numerical control part programming and manufacturing.

**ME 8513. Classical Thermodynamics. (3)** Three hours lecture. Postulational treatment of the physical laws of equilibrium, thermostatics. Equations of state, processes, equilibrium stability, reactive systems, phase transitions.

**ME 8613. Dynamical Systems. (3)** Three hours lecture. Mathematical description and simulation of systems with mechanical, electrical, pneumatic, and hydraulic components; state variables; bondgraphs; stability; observability and controllability.

**ME 8713. Mechanics and Control of Manufacturing Systems. (3)** Three hours lecture. Design and operation of computer controlled machine tools. Kinematics and control of robot manipulators. Industrial applications of robots. (Same as IE 8713).

**ME 8733. Experimental Procedures. (3)** Three hours lecture. Design of experiments; instrumentation; data acquisition; and correlation and evaluation of results.

**ME 8743. Stress Analysis. (3)** (Prerequisite: EM 3213). Two hours lecture. Three hours laboratory. Analysis of stress distributions in machine and structural members by the experimental methods of photoelasticity, electrical-resistance strain gages, and brittle coating; dynamic stress analysis.

**ME 8813. Viscous Flow I. (3)** Three hours lecture. Fundamental laws of motion for a viscous fluid; classical solutions of the Navier-Stokes equations; inviscid flow solutions; laminar boundary layers; stability criteria.

**ME 8823. Viscous Flow II. (3)** (Prerequisite: ME 8813 or equivalent). Three hours lecture. Numerical solution techniques for viscous flow equations. Turbulence and turbulence modeling. Current literature and topics.

**ME 8843. Unstructured Grid Technology. (3)** (Prerequisites: ASE 8413, proficiency in computer programming, and consent of instructor). Three hours lecture. Unstructured grid generation based on Delaunay, Advancing-Front, Iterative Point Placement, and Local-Reconnection techniques. Implementation of unstructured Finite-Element/Volume methods for engineering applications.

**ME 8990. Special Topics in Mechanical Engineering. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**ME 9000. Dissertation Research/Dissertation.** Hours and credits to be arranged.

## Department of MANAGEMENT and INFORMATION SYSTEMS

Office: 3103 McCool Hall

Professors Smith (Head), Arnett, Chrisman, Cochran, Freedman, Lehman,

A. Pearson, R. Pearson, Shim, Spencer, Taylor, Warkentin and White;

Associate Professors Barnett and Long

Assistant Professors Davis, Kellermans, Templeton and Vance

**MGT 2990. Special Topics in Management. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MGT 3114. Principles of Management and Production. (4)** (Prerequisites: EC 2113, BQA 2113, and junior standing). Four hours lecture. Management principles for all organizations including planning, organizing, leading, and controlling as well as the purposes, methods, tools, and procedures of production management.

**MGT 3213. Organizational Communications I. (3)** (Prerequisites: EN 1113 and junior standing). Three hours lecture. A study of the role of communications in the modern business organization. Emphasis is given to the basic writing skills applied to various forms of business communications.

**MGT 3323. Entrepreneurship. (3)** (Prerequisite: EC 2113). An introduction to the processes involved in owning and managing a business. Includes the entrepreneurial activities normally associated with starting and operating a business.

**MGT 3333. Field Studies in Entrepreneurship. (3)** (Prerequisite: MGT 3323). Three hours lecture. Students, working in groups under the direction of their professor, will assess the problems of an embryonic or operating entrepreneurial organization and recommend appropriate solutions.

**MGT 3413. Production Management. (3)** (Prerequisite: MGT 3114 and BQA 2113). Three hours lecture. Purposes, methods, tools, and procedures of production/operations management: systems used in large and small firms.

**MGT 3513. Introduction to Human Resource Management. (3)** Three hours lecture. Development of efficient programs for managing human resources. Emphasizes equal employment opportunity, performance evaluation, selection, placement, education, training, safety and health.

**MGT 3813. Organizational Behavior. (3)** (Prerequisites: MGT 3114). Three hours lecture. Study of behavioral theories used by managers to assist them in better understanding, anticipating, and influencing behavior in an organizational setting.

**MGT 4000. Directed Individual Study.** (Prerequisite: Junior standing). Hours and credits to be arranged.

**MGT 4113. Advanced Management. (3)** (Prerequisite: MGT 3114). Three hours lecture. A brief history of management thought and a study in depth of the managerial functions of planning, organizing, controlling.

**MGT 4153. Organization Theory. (3)** (Prerequisite: Final semester senior standing). Presents for analysis, discussion, and solution case-problems of actual situations met in day-to-day operation of business enterprise which require managerial action.

**MGT 4533. Advanced Human Resource Management. (3)** (Prerequisite: MGT 3513 or consent of instructor). Three hours lecture. Study of problems in the field of human resource management emphasizing development of the ability to analyze problems and to apply management fundamentals to human resource.

**MGT 4543. Compensation Management. (3)** (Prerequisite: MGT 3513). Three hours lecture. Compensation fundamentals, practices, and problems, including wage level determinants, wage & salary structures, merit rating, methods of wage payments, fringe benefits, & controls.

**MGT 4553. Collective Bargaining. (3)** (Prerequisite: MGT 3513). Three hours lecture. Management and union organization for collective bargaining, issues in current bargaining context, methods and procedures in bargaining, legal-administrative requirements under the NLRA as amended.

**MGT 4613. Cross-Cultural Management. (3)** (Prerequisite: MGT 3114). Three hours lecture. Study of managing in a multi-cultural environment. Focuses on global strategies, management approaches, and interactions.

**MGT 4713. Quality in Organizations. (3)** (Prerequisites: MGT 3114). Three hours lecture. An introduction to theories and tools associated with quality management in organizations. Considers the managerial, employee, organizational, and cultural changes required to enhance quality.

**MGT 4990/6990. Special Topics in Management. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MGT 7000. Directed Individual Study.** Hours and credits to be arranged.

**MGT 8000. Thesis Research/Thesis.** Hours and credits to be arranged.

**MGT 8063. Survey of Management. (3)** (Prerequisite: Graduate standing). Three hours lecture. Survey of management principles and techniques including: objective, policies, functions, leadership, organization, and production control procedures and systems as applied to all fields of business.

**MGT 8111. Human Resources Issues. (1)** (Prerequisite: MGT 8063 or equivalent). One hour lecture. Survey of nature and influences of human resource management in organizations. Case studies are used to apply and reinforce theory.

**MGT 8112. Leadership Skills for Managerial Behavior. (2)** (Prerequisite: MGT 8063 or equivalent). Two hours lecture. Survey of major behavioral skills used by managers to help them understand and influence behavior in an organizational setting.

**MGT 8121. Strategic Management. (1)** (Prerequisite: MGT 8063 or equivalent). One hour lecture. A detailed study of strategic management covering such topics as environmental analysis, competition between firms, establishing and sustaining a competitive advantage, and strategy implementation.

**MGT 8122. Business Consulting Project. (2)** (Prerequisite: MGT 8121 or equivalent). Two hours lecture. A group-based, consulting project on strategic issues currently facing a participating organization.

**MGT 8132. Project Management Field Study. (2)** Prerequisites: IE 6533 or equivalent and instructor consent). Two hours lecture. A project based field study requiring the application of specific project management skills in a organized setting.

**MGT 8213. Graduate Seminar in Communications. (3)** (Prerequisite: MGT 3114). Three hours lecture. Communication orientation to the managerial function. Includes study of verbal and nonverbal communication, persuasion, semantics, upward, downward and horizontal communication, communication skills, and communication programs.

**MGT 8413. Operations Research Problems. (3)** (Prerequisites: BQA 8443 and MGT 4413 or consent of instructor). Three hours lecture. Survey of major quantitative and operations research techniques useful in business decision-making, planning, and control; practice in model formulation and solution using the computer.

**MGT 8513. Human Resource Management. (3)** Three hours lecture. The nature, role, and scope, from a systems approach, of human resource management within organizations. Cases supplement lectures with real-life decision-making situations.

**MGT 8613. Managing in the Global Business Environment. (3)** Three hours lecture. Analysis of the global environmental elements which impact and are impacted by organizations: global politics and economics, culture, international competition, natural resources, technology.

**MGT 8813. Organizational Behavior. (3)** Three hours lecture. A study of the major behavioral theories and technologies as they relate to an organizational setting. Theory and research in the major organizational behavior areas will be emphasized.

**MGT 8823. Organization Development. (3)** (Prerequisite: MGT 3114). Study of the ways organizations can better adapt to the challenges of a modern society. The focus is on innovation, change, and action-oriented research.

**MGT 8990. Special Topics in Management. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MGT 9000. Dissertation Research/Dissertation.** Hours and credits to be arranged.

**MGT 9143. Development of Management Theory. (3)** (Prerequisite: approval of Instructor). Three hours lecture. Doctoral Seminar. A survey analysis and synthesis of the classical idea which have influenced the development of management and current management theory.

**MGT 9533. Seminar in Human Resource Management Literature. (3)** (Prerequisite: Approval of Instructor). Discussions and presentations pertaining to HRM literature. Emphasis on understanding the empirical that theoretical research in this area and developing individual theoretical manuscripts for presentation.

**MGT 9613. Organizational Theory and Practice. (3)** (Prerequisite: Approval of Instructor). Three hours lecture. Doctoral Seminar. Analysis and design of organization structure and dynamics of organization. Behavioral aspects of the executive factors affecting the administrative process within organizations.

**MGT 9813. Seminar in Organizational Behavior. (3)** (Prerequisite: Approval of Instructor). Discussions and presentations pertaining to OB literature. Emphasis on understanding the empirical add theoretical research in this area, and developing individual theoretical manuscripts for presentation.

**MGT 9913. Seminar in Strategy Formulation. (3)** (Prerequisite: Approval of Instructor). Doctoral seminar covering the strategic management literature in the area of strategy formulation.

**MGT 9933. Seminar in Strategy Implementation. (3)** (Prerequisite: Approval of instructor). Doctoral seminar covering the strategic management literature in the area of strategy implementation.

## Department of MARKETING, QUANTITATIVE ANALYSIS and BUSINESS LAW

Office: 301 McCool Hall

Professors Bryant, Capella, Eshee, LeMay, Sullivan, Tahai, Taylor and Webster;

Associate Professor Engelland (head);

Assistant Professors Chakrabarty, G. Liddell, P. Liddell, Lueg, M. Moore, R. Moore and Ponder-Lueg;

Instructors Goree, Lam and Still

**MKT 2990. Special Topics in Marketing. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MKT 3013. Principles of Marketing. (3)** (Prerequisite: junior standing). Three hours lecture. A general survey of the functions, processes, institutions and costs in distribution of goods and services from producers to users.

**MKT 3213. Retailing. (3)** (Prerequisite: MKT 3013 and Junior standing). Three hours lecture. Survey of the nature, procedure and results of trade at the retail level.

**MKT 3933. International Marketing. (3)** (Prerequisites: MKT 3013, and senior standing in business/marketing.) Three hours lecture.

Study of the marketing function in the global marketplace, including the techniques and strategies required when marketing in various cultural, economic, legal and political environments.

**MKT 4000. Directed Individual Study.** Hours and credits to be arranged.

**MKT 4113. Personal Selling. (3)** (Prerequisite: Junior standing). Three hours lecture. Psychology of personal selling; planning and presentation; the sales approach; the interview; closing the sale.

**MKT 4123. Advertising. (3)** (Prerequisite: MKT 3013 or consent of instructor). Three hours lecture. A course dealing with the role of advertising in society, the relation of advertising to other business activity, and the use of advertising as communication.

**MKT 4143/6143. Sales Management. (3)** (Prerequisites: MKT 3013 and MGT 3114). Three hours lecture. Application of scientific management to the selling and distribution of consumer and industrial goods.

**MKT 4213/6213. Internet Marketing. (3)** (Prerequisite: MKT 3013). Three hours lecture. Introduction to practical marketing use of Internet technologies, including basic principles, impact on business and society, and strategic implications.

**MKT 4233/6233. Golf Merchandising Management. (3)** (Prerequisite: PGM Major, MKT 3213). Three hours lecture. Development of marketing strategies for the organization, operation, and maintenance of operations in the golf shop and golf course environment.

**MKT 4413. Consumer Analysis and Behavior. (3)** (Prerequisite: MKT 3013). A study of the nature and dynamics of consumer markets, and the significance of these markets to marketing executives.

**MKT 4533. Marketing Research. (3)** (Prerequisites: BQA 3123 and MKT 3013). Three hours lecture. Study of modern marketing research techniques and their applications. Scope and purpose of marketing research: planning of surveys; collecting and analysis of data; preparation of reports.

**MKT 4613. Services Marketing. (3)** (Prerequisite: MKT 3013.) Three hours lecture. A study of the unique problems associated with the marketing of services and of alternative strategies with which to improve service marketing effectiveness.

**MKT 4813. Marketing Management. (3)** (Prerequisites: Marketing Graduating Senior). Marketing from managerial viewpoints: critical analysis of functions of marketing opportunity assessment, marketing planning and programming, marketing leadership and organization, evaluating and adjusting marketing effort.

**MKT 4990/6990. Special Topics in Marketing. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MKT 7000. Directed Individual Study.** Hours and credits to be arranged.

**MKT 8000. Thesis Research/Thesis.** Hours and credits to be arranged.

**MKT 8072. Survey of Marketing. (2)** (Prerequisite: Graduate standing; EC 8043, equivalent of concurrent enrollment). Two hours lecture. Survey of product, price, promotion, and distribution decisions in for-profit and non-profit settings; external environmental factors affecting marketing decisions; focus on strategic decision making.

**MKT 8112. Marketing Management. (2)** (Prerequisite: MKT 8072 or equivalent). Two hours lecture. A graduate survey of marketing focused on the strategic analysis and planning necessary to effectively match marketing strategies with changing macro, micro, and organizational environments.

**MKT 8122. Management of Delivery Systems. (2)** (Prerequisite: MKT 8072 or equivalent). Two hours lecture. Provides knowledge of op-

erations, purchasing and logistics that is crucial to managing in the modern business world.

**Market 8132. Business Research Methods. (2)** (Prerequisite: MKT 8072 or equivalent). Two hours lecture. Investigation of the managerial decisions involved with the development of questionnaires, creation of a sampling plan, collection and analysis of data, and presentation of results.

**MKT 8313. Marketing Policies. (3)** (Prerequisite: MKT 3013). Three hours lecture. A graduate survey of marketing focused on the analysis and planning necessary to effectively match marketing programs with competitive, economic, social, political and ethical environments.

**MKT 8323. Problems in Marketing. (3)** (Prerequisite: MKT 8112 or equivalent). Seminar. Identification of current marketing problems and the specification, evaluation and modification of strategies for their resolution, with emphasis on the use of conceptual modeling.

**MKT 8333. Seminar in Marketing—Promotion and Distribution Strategies. (3)** (Prerequisite: MKT 8313). Intensive analysis of promotion and distribution strategies as key functional marketing variables. Emphasis is on obtaining an advanced understanding of strategic and research alternatives.

**MKT 8343. Seminar in Marketing—Pricing and Product Strategies (3)** (Prerequisite: MKT 8313). Intensive analysis of pricing and product strategies as key functional marketing variables. Emphasis is on obtaining an advanced understanding of strategic and research alternatives.

**MKT 8413. Seminar on Consumer Behavior. (3)** (Prerequisite: MKT 8313). An analysis of macro and micro consumer behavior. Particular emphasis is placed on the consumer decision process in the market place.

**MKT 8533. Research Design and Execution. (3)** (Prerequisite: Consent of instructor). Interdisciplinary; designing and executing valid quantitative research projects, development valid, reliable data collection instruments, correctly analyzing, interpreting data. Wide-range applicability. Master-doctoral-level.

**MKT 8543. Quantitative Marketing Seminar. (3)** (Prerequisites: MKT 8313 and BQA 8443 or consent of instructor). Development of marketing strategy and the solution of marketing problems using quantitative methods.

**MKT 8990. Special Topics in Marketing. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MKT 9000. Dissertation Research/Dissertation.** Hours and credits to be arranged.

**MKT 9333. Advanced Marketing Theory. (3)** (Prerequisite: MKT 8313). Seminar. A critical examination of the evolution of marketing concepts, terminology, principles, and theory, through analysis of the literature in the field.

## MILITARY SCIENCE

Office: 1st Floor, Middleton Hall

LTC McManigal, Major Graham, Major Smith, Major Ahshapanek  
MSG Lacour, SFC Marquez, SGT Betts

**MS 1112. Introduction to ROTC. (2)** One hour lecture. Two hours laboratory. Increases self-confidence through team study and activities in basic drill, physical fitness, rappelling, first aid, and basic marksmanship. Students learn fundamental concepts of leadership.

**MS 1122. Introduction to Leadership. (2)** One hour lecture. Two hours laboratory. Applies principles of effective leadership, develops communications skills to improve individual performance and group interaction, and relates organizational ethical values to the effectiveness of leaders.

**MS 2113. Advanced Leadership. (3)** Two hours lecture. Two hours laboratory. Applies leadership and problem-solving principles to complex case studies/simulations. Examines principles of subordinate motivation and organizational skills. (Fall).

**MS 2123. Tactics and Officership. (3)** Two hours lecture. Two hours laboratory. Introduces basic tactics. Examines national and Army values. Applies principles of ethical decision-making. Examines the legal and historical foundations, duties and functions of officers. (Spring)

**MS 2256. Introductory Leadership Course. (6)** (The equivalent of MS 1112, MS 1122, MS 2122; or MS 1113 and MS 2223). Summer leadership training course designed to introduce students to all facets of the military with a focus on understanding traditional military leadership values. (Summer)

**MS 3113. Advanced Military Skills I. (3)** (Prerequisites: MS 1112, MS 1122, MS 2112, and MS 2122 or instructor's consent.) Fall semester. Three hours lecture. Two hours laboratory. Detailed instruction on prob-

lem solving, squad offensive and defensive tactics, to include specialized operations. Additional instruction in leadership and operations orders.

**MS 3123 Advanced Military Skills II. (3)** (Prerequisite: MS 1112, MS 1122, MS 2112, MS 2122, MS 3113 or instructor's consent.) Spring Semester. Three hours lecture. Two hours laboratory. Advanced instruction on platoon tactical operations and small unit patrolling. Discussion on the operation and employment of weapons in the platoon.

**MS 3376. Advanced Leadership Course. (6)** (Prerequisite: MS 3113 and MS 3123). Summer leadership training course designed to train and to evaluate cadet's leadership ability and officer potential. (Summer)

**MS 4000. Directed Individual Study.** Hours and credits to be arranged. Maximum of six hours.

**MS 4114/6114. Leadership Challenges and Goal-Setting. (4)** (Prerequisite: Military Science Status or consent of instructor). Three hours lecture. Three hours laboratory. Plan, conduct and evaluate activities of the ROTC organization. Develop confidence in skills to lead people and manage resources. Apply Army policies and programs. (Fall)

**MS 4124/6124. Transition to Lieutenant. (4)** (Prerequisite: Military Science Senior Status or consent of instructor). Three hours lecture. Three hours laboratory. Theory and practice of the laws of war, leadership, and resolving ethical problems.

**Department of MUSIC EDUCATION**

Music Building

Professors Michael R. Brown (Head), Edwards-Henry, Hood, Johns and Smith  
Associate Professors Damm and Pappas

Assistant Professors Human, Min and Sebba; Instructors Aarhus, Falcone, Huff and Payton

**Music**

**MU 1010. Recital Hour. (0)** Minimum one (1) hour weekly. Performance and critique experiences in applied music. Required for music majors.

**MU 1103. African American Music. (3)** Three hours lecture. A study of African musical and cultural traditions with focus on the impact of these traditions on the development and advancement of African American Music.

**MU 1111-1121. Piano Class. (1)** Two hours laboratory. Beginning piano for non-music majors.

**MU 1113. History and Appreciation of Music. (3)** Three hours lecture. Historical development of music and the composers of the different eras; individual investigation of related special topics; individual and directed listening to musical examples.

**MU 1131. Voice Class. (1)** Two hours laboratory. Class study of Voice Production.

**MU 1162. Survey of Music Styles. (2)** Two hours lecture. An introduction to musical styles with special focus on the basic structural elements and performance media in each style. (Required for all music majors.)

**MU 1211. Guitar Class. (1)** Two hours laboratory. Class study of guitar-playing techniques at the beginning level.

**MU 1213-1413. Music Theory I (3) and Music Theory II. (3)** Three hours lecture. A course for music majors in which the elements of form, melody, rhythm, and harmony of music are studied on an integrated plan.

**MU 1321-1521. Ear Training I (1) and Ear Training II. (1)** Two hours laboratory. A course for music majors utilizing micro and macro-listening to emphasize melodic, harmonic, and rhythmic patterns and relationships in music.

**MU 2011. Third Year Woodwind Ensembles. (1)** (Audition required). One to five rehearsals per week. The study and performance of significant woodwind literature. May be repeated for credit more than once.

**MU 2111-2121. Piano Class. (1)** Two hours laboratory. Beginning piano for instrumental and vocal music majors.

**MU 2322. History and Literature of Music I. (2)** Two hours lecture. An intensive study of the history of music, composers, and significant literature with special research topics. (Primarily for music majors).

**MU 2323. History and Literature of Music II. (3)** Three hours lecture. Emphasis on classifying and identifying period and composer characteristics. (Primarily for music majors.)

**MU 2511. Marching Band. (1)** (Audition required). One to five rehearsals per week. The study and performance of significant marching band literature. May be repeated for credit more than once. (Fall semester only).

**MU 2551. Percussion Ensemble. (1)** (Audition required). One to five rehearsals per week. The study and performance of significant percussion literature. May be repeated for credit more than once.

**MU 2561. Symphonic Band. (1)** (Audition required). One to five rehearsals per week. The study and performance of significant symphonic band literature. May be repeated for credit more than once. (Spring semester only).

**MU 2571. Wind Ensemble. (1)** (Audition required). One to five rehearsals per week. Study, rehearsal, and performance of select literature from the wind band repertory. May be repeated for credit more than once.

**MU 2611. Concert Choir. (1)** (Audition required). One to five rehearsals per week. The study and performance of significant choral literature. May be repeated for credit more than once.

**MU 2613-2813. Music Theory III (3) and Music Theory IV. (3)** (Prerequisite: MU 1213-1413). Three hours lecture. A course for music majors in which the elements of form, melody, rhythm, and harmony of music are studied on an integrated plan.

**MU 2711. Pop/Jazz Choir. (1)** (Audition required). One to five rehearsals per week. The study and performance of significant choral literature. May be repeated for credit more than once.

**MU 2721-2921. Ear Training III (1) and Ear Training IV. (1)** Two hours laboratory. A course for music majors utilizing micro and macro-listening to emphasize melodic, harmonic and rhythmic patterns and relationships in music.

**MU 2731. Chamber Singers. (1)** (Audition required). One to five rehearsals per week. The study and performance of significant choral literature. May be repeated for credit more than once.

**MU 2851. Brass Ensembles. (1)** (Audition required). One to five rehearsals per week. The study and performance of significant brass literature. May be repeated for credit more than once.

**MU 2911. Jazz Ensemble. (1)** (Audition required). One to five rehearsals per week. The study and performance of significant jazz ensemble literature. May be repeated for credit more than once.

**MU 2990. Special Topics in Music. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MU 3111-3121. Piano Class. (1)** (Prerequisite: grade of C or better in MU 2121 or equivalent or permission of instructor). Two hours laboratory. Intermediate piano for instrumental and vocal music majors; continuation of MU 2121.

**MU 3112-3122. Piano Class. (2)** (Prerequisite: Prior credit or concurrent enrollment in MU 1213-1413). Two hours laboratory. Functional keyboard skills for music majors who read and play intermediate to advanced-level piano repertoire.

**MU 3123 Basics of Music. (3)** (Admission to Teacher Education required.) Three hours lecture. An exploration of basic musical elements through listening; singing; movement; and playing rhythm, melodic, and ethnic instruments, utilizing a variety of multicultural and orchestral music.

**MU 3333. Orchestration. (3)** Three hours lecture. Basic arranging/orchestration techniques for chorus and band. The student will learn the practical ranges of band instruments and voices so that they can write idiomatically.

**MU 3412. Conducting. (2)** Two hours lecture. The elements of conducting, baton technique, and interpretation.

**MU 3442. Advanced Conducting. (2)** (Prerequisite: MU 3412 or consent of instructor). One hour lecture. Two hours laboratory. Continuation of MU 3412 with emphasis on interpretation of significant instrumental and choral literature.

**MU 4000. Directed Individual Study.** Hours and credits to be arranged.

**MU 4313. Form and Analysis. (3)** (Prerequisites: MU 2214/2224). Three hours lecture. A comparative survey for music majors of the principal formal designs found in instrumental and vocal literature with emphasis on compositional techniques and harmonic structure.

**MU 4990/6990. Special Topics in Music. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MU 7000. Directed Individual Study.** Hours and credits to be arranged.

**MU 8990. Special Topics in Music. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**Band**

Office: Band Hall

Director: Elva Kaye Lance

**MU 2511. Marching Band. (1)****MU 2531. Concert Band. (1)** Second Semester Only.**Symphonic Band****MU 2561. Symphonic Band. (1)** Second Semester Only.**Wind Ensemble****MU 2571. Wind Ensemble (1)****Choral**

Office: Choral Building

Director: Jeff Pappas

Training in the correct principles of singing. Stress on tone quality, enunciation, pronunciation, even scale and musicianship. Repertoire for

each of the choral groups during a four-year period is designed to provide participants with opportunity to study and perform standard and contemporary compositions.

**Chorus**

- MU 2611. Concert Choir. (1)**
- MU 2631. Starkville Community Choir. (1)**

**Vocal Ensembles**

- MU 2711. Pop/Jazz Choir. (1)**
- MU 2731. Chambers Singers. (1)**

**Instrumental Ensembles**

**Woodwind Ensembles**

- MU 2011. Woodwind Ensemble. (1)**

**Brass Ensembles**

- MU 2851. Brass Ensemble. (1)**

**Stage Band**

- MU 2911. Jazz Ensemble. (1)**

**APPLIED MUSIC**

Variable credit 1 or 2 hours credit: 3 hours practice per week per hour of credit. May be repeated for credit.

All students of applied music will be given proficiency examinations which will be held at the end of each semester. All Music Majors are required to perform in Student Recital on their major instrument at least once each semester. (Does not apply in the first semester of the freshman year or during the student teaching semester).

<b>MUA 1010, 2010, 3010.</b>	<b>Piano</b>
<b>MUA 1050, 2050, 3050.</b>	<b>Voice</b>
<b>MUA 1110, 2110, 3110.</b>	<b>Flute</b>
<b>MUA 1150, 2150, 3150.</b>	<b>Clarinet</b>
<b>MUA 1210, 2210, 3210.</b>	<b>Saxophone</b>
<b>MUA 1250, 2250, 3250.</b>	<b>Oboe</b>
<b>MUA 1310</b>	<b>Bassoon</b>
<b>MUA 1350, 2350, 3350.</b>	<b>Trumpet</b>
<b>MUA 1410, 2410, 3410.</b>	<b>Horn</b>
<b>MUA 1450, 2450, 3450.</b>	<b>Trombone</b>
<b>MUA 1510, 2510, 3510.</b>	<b>Euphonium</b>
<b>MUA 1550, 2550, 3550.</b>	<b>Tuba</b>
<b>MUA 1610, 2610, 3610.</b>	<b>Percussion</b>
<b>MUA 1650</b>	<b>Strings</b>
<b>MUA 1750, 2750, 3750.</b>	<b>Organ</b>

**MUSIC EDUCATION**

**MUE 2990. Special Topics in Music Education. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MUE 3001. Practicum in Music Education. (1)** Two hours laboratory. Observation, discussion, and critique of elementary and secondary school music classroom settings.

**MUE 3212. Brass Techniques. (2)** Two hours lecture. Study of brass winds with emphasis on embouchure, techniques, and teaching problems.

**MUE 3213. Performance Assessment in Music Education. (3)** (Prerequisite: Admission to Teacher Education) Three hours lecture. Limited to music majors. Methods and materials of performance assessment in music education.

**MUE 3221. Woodwind Class. (1)** Two hours laboratory. Study of woodwinds with emphasis on embouchure, techniques, and teaching problems.

**MUE 3222. Woodwind Techniques. (2)** Two hours lecture. Study of woodwinds with emphasis on embouchure, techniques, and teaching problems.

**MUE 3231. String Class. (1)** Two hours laboratory. Study of strings with emphasis on bowing, techniques, and teaching problems.

**MUE 3242. Percussion Class. (2)** Two hours lecture. Detailed study of percussion instruments with emphasis on teaching problems, training materials, and performance literature.

**MUE 3243. Planning and Managing Learning in Music Education. (3)** (Prerequisite: Admission to Teacher Education). Three hours lecture. Study of variables contributing to efficiency and competency for teacher-learner activities and the creation and maintenance of a positive learning environment in music classrooms.

**MUE 3262. Instrumental Class. (2)** One hour lecture. Two hours laboratory. Instrumental experiences for vocal and piano majors.

**MUE 3333. Introduction to Piano Pedagogy. (3)** Two hours lecture. Two hours laboratory. Methods, materials, curriculum building, and philosophical bases for teaching beginning piano. Required of all piano pedagogy students.

**MUE 4000. Directed Individual Study.** Hours and credits to be arranged.

**MUE 4873. Professional Seminar in Music Education. (3)** (Prerequisites: Admission to Teacher Education and senior standing). Three hours lecture. A seminar dealing with legal, professional, administrative, and curriculum issues as they relate to music education in the schools.

**MUE 4886, 4896. Student Teaching in Music Education. (6,6)** (Both courses to be taken concurrently). (Prerequisites: Admission to Teacher Education and senior standing). Supervised observation and directed teaching in respective field of endorsement.

**MUE 4990/6990. Special Topics in Music Education. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**MUE 7000. Directed Individual Study.** Hours and credits to be arranged.

**MUE 8990. Special Topics in Music Education. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**NUTRITION**

(For the interdisciplinary graduate programs in Nutrition, consult College of Agriculture and Life Sciences section of this *Catalog*, and the *Graduate Bulletin*.)

**NTR 4115/6115. Nutrition. (5)** Spring Semester. (Prerequisites: CH 2503, CH 2501). Five hours lecture. Nutrition of monogastric and ruminant species. Anatomy, physiology, digestion and absorption pertaining to monogastric and ruminants. Description, functions, sources, deficiency symptoms and requirements of nutrients.

**NTR 4253/6253. Human Nutrition I. (3)** (Prerequisites: BIO 2014 and CH 2503 or equivalent). Three hours lecture. Advanced human nutrition: digestion, metabolism, function, requirements, and recommendations for carbohydrates, lipids, proteins and water. (Same as NTR 4253/6253).

**NTR 4293/6293. Human Nutrition II. (3)** (Prerequisites: BIO 4253/6253 or consent of instructor). Three hours lecture. Advanced human nutrition and metabolism with emphasis on the functions, require-

ments, and recommendations of the regulatory nutrients (vitamins and minerals) and water. (Same as HS 4293/6293).

**NTR 4990/6990. Special Topics in Nutrition. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**NTR 6233. Medical Nutrition Therapy. (3)** (Prerequisites: HS 3213, HS 4223, BCH 3613 and BIO 2014 or consent of instructor). Two hours lecture. Two hours laboratory. Treatment of human diseases through nutrient modification. (Same as HS 6233).

**NTR 6243. Nutrition Throughout the Life Cycle. (3)** (Prerequisite: HS 4223/6223). Three hours lecture. Study of interrelationships of physiological, biochemical and sociological factors and nutrient needs of individuals and groups during the life cycle; infancy through the later years. (Same as HS 4243/6243).

**NTR 6333. Fish and Shellfish Nutrition. (3)** (Prerequisites: CH 2503 and CH 2501 or BCH 3613). Three hours lecture. Fundamental

and applied aspects of the nutrition of fish, crustacean, and mollusk species including feeding behavior, nutritional ecology, energetics, and nutrient requirements. (Same as WF 4333/6333).

**NTR 6423. Feed Manufacturing. (3)** (Prerequisites: CH 2503 and CH 2501). Two hours lecture. Two hours laboratory. Mill design and equipment; procurement, storage and quality control for ingredients and complete feeds; formulation of practical type poultry rations. (Same as PO 4423/6423).

**NTR 7000. Directed Individual Study.** Hours and credits to be arranged.

**NTR 8000. Thesis Research and Thesis.**

**NTR 8111-8131. Nutrition Seminar. (1)** Survey of current literature; preparation, organization, and presentation of papers on selected topics in nutrition.

**NTR 8123. Methods in Nutrition Research. (3)** Fall semester. (Prerequisites: NTR 4115/6115 and ST 8114 or equivalent). Two hours lecture. Three hours laboratory. Application of analytical methods used in research techniques; practice in writing research proposals, conducting a research project, and preparing research finds suitable for scientific publication.

**NTR 8153. Ruminant Nutrition. (3)** (Prerequisite: NTR 4115/6115 or Equivalent). Three hours lecture. In-depth treatment of rumen function and recent concepts in ruminant nutrition.

**NTR 8162. Monogastric Nutrition. (2)** Fall semester. (Prerequisite: NTR 4115/6115 or equivalent). Two hours lecture. Monogastric nutritional relationships with special emphasis on swine nutrition. Metabolic functions, dietary requirements, deficiency symptoms and distribution of nutrients in feedstuffs.

**NTR 8233. Maternal, Infant and Child Nutrition. (3)** Three hours lecture. Nutritional needs during reproduction and growth; problems in nourishing women during the reproductive period, infants, and children; indices of growth and development. (Same as HS 8233).

**NTR 8243. Community Nutrition. (3)** (Prerequisite: HS 3213). Three hours lecture. Nutrition services and problems in the community.

Supervised experience in methods for determining and implementing action programs in nutrition education. (Same as HS 8243).

**NTR 8253. Nutrition and Food Science Research Techniques. (3)** Spring semester. One hour lecture. Six hours laboratory. Application of various instruments and techniques for assay of food and biological material. (Same as FST 8253).

**NTR 8261. Dietetic Internship Seminar. (1)** (Prerequisite: Admission into the School of Human Sciences Dietetic Internship/Graduate Studies Program). One hour lecture. Selection of current topics in foods, nutrition or dietetics and in-depth review of current literature for critical analysis presentation. (Same as HS 8261).

**NTR 8273. Dietetic Internship Capstone. (3)** (Prerequisite: Admission into the School of Human Sciences Dietetic Internship/Graduate Studies Program). Three hours lecture. Theoretical aspects of dietetics gained through the study of resources, technology, professional standards, and other factors that influence entry-level practice. (Same as HS 8273).

**NTR 8443. Avian Nutrition. (3)** (Prerequisite: NTR 4115/6115 or equivalent). Three hours lecture. Study of the nutrient functions, dietary relationships, deficiency symptoms, distribution in feedstuffs and quantitative requirements of nutrients.

**NTR 8463. Advanced Animal Nutrition. (3)** (Prerequisite: NTR 4115/6115 or prior approval from instructor). Two hours lecture. Two hours laboratory. Develop an understanding of nutritional physiology, metabolism, and utilization of nutrients by animal species.

**NTR 8473. Micro-Nutrient Nutrition. (3)** (Prerequisite: NTR 8114 or equivalent). Three hours lecture. Detailed study of functions, deficiency symptoms, dietary considerations necessary to the nutrition of fish, dogs, cats, horses, mink, rabbits, and laboratory animals.

**NTR 8990. Special Topics in Nutrition. (1-9)** Credit and title to be arranged. This course is to be used on a limited basis to offer developing subject matter areas not covered in existing courses. (Courses limited to two offerings under one title within two academic years).

**NTR 9000. Dissertation Research and Dissertation.** Hours and credits to be arranged.

## Department of HEALTH, PHYSICAL EDUCATION, RECREATION and SPORT

Office: 216 McCarthy Gymnasium

Professors: Abadie, Hunt, Kirk (head); Associate Professor: Lamberth;  
Assistant Professors: Chromiak, Dohoney, Foxworth, Letter, Rukavina, Smith and Thompson;  
Instructors: Funderburk, Wiley, and Young.

**PE 1001. Racquetball. (1)** Two hours laboratory. Emphasis is on rules, knowledge, skill development, and team tactics necessary to successfully participate in an organized game.

**PE 1021. Basic Physical Fitness Concepts. (1)** Two hours laboratory. Basic knowledge, understandings and values of physical fitness. Emphasis on individualized fitness evaluation procedures and diversified program construction.

**PE 1041. Aerobics. (1)** Two hours laboratory. Assessment, development and maintenance of physical fitness through aerobic exercises to music.

**PE 1051. Beginning Karate. (1)** Two hours laboratory. The essential principles both physical and psychological will be stressed. Emphasis is placed on organization of karate techniques and training methods.

**PE 1071. Soccer. (1)** Two hours laboratory. Emphasis is on rules, knowledge, skill development, and team tactics necessary to successfully participate in an organized game.

**PE 1081. Beginning Golf. (1)** Two hours laboratory. Instruction and laboratory experience in the development of individual skills for participation in golf.

**PE 1091. Contemporary Dance. (1)** Two hours laboratory. A non-majors course designed to develop skills in contemporary dance routines.

**PE 1101. Karate for Intermediates. (1)** (Prerequisite: PE 1051 or prior Karate experience having attained the rank of Yellow Belt). Two hours laboratory. Current events of the American Karate world. Advanced free-fighting and self-defense techniques. Interpretation of forms.

**PE 1112. Teaching Team Sports. (2)** One hour lecture. Two hours laboratory. Theory of and participation in non-traditional and traditional team sports. Analysis of skills, discussion of developmental appropriateness, terms, basic rules and teaching strategies.

**PE 1121. Advanced Physical Development. (1)** Two hours laboratory. A continuation of PE 1111. This course is designed to further the understanding in the conceptual knowledge of fitness and physical conditioning and maintenance of human wellness. (May be taken up to four times for credit).

**PE 1122. Teaching Individual and Dual Sports. (2)** One hour lecture. Two hours laboratory. Theory of and participation in non-traditional and traditional individual and dual sports. Analysis of skills, discus-

sion of developmental appropriateness, terms, basic rules and teaching strategies.

**PE 1123. History and Appreciation of Dance. (3)** Two hours lecture, two hours laboratory. A course designed to acquaint students with the history of dance and to develop a greater sensitivity, appreciation and understanding of this art.

**PE 1131. Fitness Walking/Jogging. (1)** Two hours laboratory. An exercise and activity class emphasizing walking and/or jogging to develop and maintain fitness, weight control and flexibility.

**PE 1132. Teaching Lifetime Activities. (2)** One hour lecture. Two hours laboratory. Activities, methods and theories within outdoor education. Introduction of concepts, activities, technologies and teaching methods for strength training, aerobic conditioning, fitness assessment and stress management.

**PE 1142. Teaching Rhythms. (3)** One hour lecture. Two hours laboratory. Instruction, demonstration, skill development, and teaching techniques in the areas of square, folk, and contemporary dance.

**PE 1151. Teaching Gymnastics and Tumbling. (1)** (Prerequisite: Consent of instructor). Two hours laboratory. Teaching methods for instructional procedure in gymnastics and tumbling. (May be taken up to four times for credit).

**PE 1181. Training Techniques for Physical Conditioning. (1)** Two hours laboratory. Provides the student with theoretical and laboratory experiences in the development of muscular strength, flexibility, and cardiovascular endurance. (May be taken up to four times for credit).

**PE 1213. Introduction to Exercise Science. (3)** Three hours lecture. This course is designed to provide students and overall understanding of the professions within Exercise Science.

**PE 1221. Volleyball. (1)** Two hours laboratory. Emphasis is on rules, knowledge, and team tactics necessary to successfully participate in an organized game.

**PE 1223. Personal Health. (3)** Three hours lecture. An introductory survey of the multiple dimensions of health. Focus is upon healthy behaviors across the lifespan as well as environmental and social influences.

**PE 1231. Modern Dance. (1)** (Prerequisite: Consent of Department Head). Two hours laboratory. Laboratory experience including a wide