
Graduate Courses of Instruction

Graduate Courses of Instruction *Acupuncture*

Graduate courses are offered at two levels. Courses at the 400 level are open to graduate students and to a limited number of qualified undergraduates; 500-level courses are open, in most cases, to graduate students only. For the convenience of graduate students involved in daytime professional work, most courses are scheduled Monday through Thursday between 4 and 10 p.m.; both 400- and 500-level courses meet either for a single 100-minute period or for two regular 75-minute periods, depending upon the nature of the course and the policy of the department. These policies do not apply to the College of Chiropractic, the College of Naturopathy, or the Nutrition Institute.

Some graduate courses are offered every year, but many are scheduled over a two-year or three-year cycle. It is, therefore, essential that graduate students should carefully plan entire programs with their graduate advisors so that they will be able to register for all required courses over the time span in which they expect to complete the degree. The University reserves the right to limit the number of students registered in any graduate course, and also the right to cancel any course for which there is insufficient enrollment.

Acupuncture

ORIENTAL THEORY, DIAGNOSIS AND APPLICATION (ATD):

ORIENTAL THEORY, DIAGNOSIS AND APPLICATION 511:

Oriental History and Philosophy.

The student will study the different eras of Chinese history and the effect it had on Oriental Medicine theories. This course will include study of the development of Naturalism, Philosophical and Religious Taoism, Confucianism and Buddhism. For each philosophy, the course will examine how the philosophy views the human relationship to nature, and the human relationship to the universe. In addition,

the impact the philosophy and religion had on the Oriental medical paradigm will be explored. Prerequisites: none.

1 lecture hour, 0 laboratory hours, 1 semester credit

ORIENTAL THEORY, DIAGNOSIS AND APPLICATION 512:

Oriental Medical Theory.

This course includes the classic theories of yin and yang and the Five phases that are fundamental to understanding the Oriental medical relationship between humans and the universe. Normal physiology is studied through the fundamental substances (Qi, Blood, Essence, Spirit and bodily fluids), and organs. The basic theory of illness and diagnosis using four examinations (sight, listening and smelling, palpation, and asking) and Eight parameters are covered. Prerequisite: Anatomy and Physiology.

2 lecture hours, 2 semester credits

ORIENTAL THEORY, DIAGNOSIS AND APPLICATION 513:

Oriental Diagnosis I.

The basic theory and characteristics of the pathogenesis and pathogenic factors are covered including the seven emotions, disharmony of Yin and Yang, abnormalities in Qi, Blood, Spirit, Essence and Bodily fluids and organ disharmonies are covered. Techniques in inquiry, palpation, tongue and pulse diagnosis are covered. Diagnoses incorporating the eight parameters as well as root and stem concepts are covered for each of the twelve zang-fu. Prerequisite: ATD 512 Oriental Medical Theory.

2 lecture hours, 2 semester credits

ORIENTAL THEORY, DIAGNOSIS AND APPLICATION 524:

Oriental Diagnosis II.

This course will focus on continuing to elucidate diagnostic patterns including multi-organ disharmonies, six channel patterns, patterns of acute illness and EPIs. Extra meridian diagnosis and treatments will be covered. In addition, the student will learn how time of day and time of year can be used both for diagnosis and treatment. Western medical diagnoses will be analyzed and differentiated to reframe the diagnosis and treatment planning will be discussed. Prerequisite: ATD 523 Oriental Diagnosis I.

2 lecture hours, 2 semester credits

ORIENTAL THEORY, DIAGNOSIS AND APPLICATION 711:

East-West Pathology.

This course will compare and contrast diagnosis and the treatment between Western and Oriental diagnoses. Western medical diagnosis of these diseases will be incorporated so that the student will be able to collaborate with Western physicians. Major and common categories of diseases including respiratory tract, infectious, gastrointestinal, genitourinary and musculoskeletal diseases will be covered. Prerequisite: ATD 513 Oriental Diagnosis I.

2 lecture hours, 2 semester credits

ORIENTAL THEORY, DIAGNOSIS AND APPLICATION 661:

Oriental Internal Medicine.

This course will focus on the diagnosis and Oriental treatment of major illness. Treatment planning, including acupuncture, Qi Gong, and herbs for gastrointestinal, genitourinary, gynecological, and psychological illnesses. Root-stem and 5 Element treatments will be included. Prerequisite: ATD 513 Oriental Diagnosis I.

2 lecture hours, 2 semester credits

WESTERN BIOMEDICINE (AWB):

WESTERN BIOMEDICINE 511E:

Medical History of East and West.

This course will teach the student different forms of preventative medicine that has grown throughout the United States. It will explain the changing standards of the medical profession and health care standards. (Elective)

2 lecture hours, 2 semester credits

WESTERN BIOMEDICINE 521:

Clean Needle Technique.

This course is designed to teach students clinical skills necessary for their role as clinicians. Clean Needle Technique and a review of Occupational Safety and Health Administration (OSHA) standards are presented. Prerequisites: none.

2 lecture hours, 2 semester credits

Acupuncture

WESTERN BIOMEDICINE 621:

Ethics.

This course is designed to provide the student with a basic understanding of the ethical issues surrounding licensed practice in the field of acupuncture. Upon completion of this course, the student will be able to identify concepts of medical and professional ethics as they apply to the practice of health care. Time is devoted to the study of the laws and regulations of Oriental medicine. Prerequisites: none.
1 lecture hour, 1 semester credit

Anatomy, Physiology, Pathology and Clinical Diagnosis – refer to Naturopathic Medicine section of the catalogue.

Lab Diagnosis, Emergency Medicine/CPR, Nutrition, Botanical Medicine I, Botanical Medicine II, Palpation/Massage, Psychology, Practice Management and Public Health – refer to Naturopathic Medicine section of catalogue.

HERBAL MEDICINE THEORY (AHM):

HERBAL MEDICINE THEORY 511:

Pharmacognosy and Toxicology.

This class will introduce the student to the chemical constituents and actions of Chinese herbs and formulae. Signs and treatments for toxicities will be covered. Prerequisites: none.
1 lecture hour, 1 semester credit

HERBAL MEDICINE THEORY 612:

Materia Medica I: Patent Remedies.

This course will survey the major patent remedies used for common medical ailments. Actions, indications, contraindications and complications of these remedies will be covered. Safety issues, endangered species and adulteration of remedies will be elucidated. Prerequisite: ATD 512 Oriental Medical Theory
1 lecture hour, 1 semester credit

HERBAL MEDICINE THEORY 714:

Materia Medica II.

This class will introduce the student to the top 250 herbs in the Chinese pharmacopoeia. They will learn the system of clas-

sifying herbs according to their properties; taste, temperature, meridians entered, indications and contraindications. Prerequisite: AHM 511 Pharmacognosy and Toxicology.
2 lecture hours, 2 semester credits

HERBAL MEDICINE THEORY 722:

Herbal Formulae.

This class will introduce the student to the laws of combining herbs. Major categories of herbal formulae will be covered including indications, contraindications, and possible side effects. Precautions in dispensing herbal preparations will be covered. Prerequisite: AHM 714 Materia Medica II
2 lecture hours, 2 semester credits

HERBAL MEDICINE THEORY 613:

Oriental Dietetics and Nutrition.

This class will introduce the student to the Eastern understanding of how food will influence human health. Foods and food products are surveyed according to Asian categorization. Food groups will be categorized by nature, temperature, taste, element, indications and contraindications. Treatment of the major categories of organ (zang-fu) disorders using foods and food combining will be covered. Prerequisite: ATD 511 Oriental Diagnosis I
2 lecture hours, 2 semester credits

MOVEMENT AND RESPIRATION STUDIES (AMR):

MOVEMENT AND RESPIRATION STUDIES 511:

Tai Ji Chuan I.

This introductory course in energetic medicine teaches the awareness of energy pathways and flow, by experiencing one's own body through movement and breathing. Prerequisites: none
0 lecture hours, 2 laboratory hours, 1 semester credit

MOVEMENT AND RESPIRATION STUDIES 522:

Tai Ji Chuan II.

This is a continuation of the first class in which the student will expand their aware-

ness of energy pathways and flow, by experiencing one's own body movement and breathing. Prerequisite: AMR 511 Tai Ji Chuan I
0 lecture hours, 2 laboratory hours, 1 semester credit

MOVEMENT AND RESPIRATION STUDIES 613:

Qi Gong I

This course teaches the awareness of energy pathways and flow, by experiencing one's own body movement and breathing through continued work with forms of Qi Gong. Prerequisite: AMR 522 Tai Ji Chuan II
0 lecture hours, 2 laboratory hours, 1 semester credit

MOVEMENT AND RESPIRATION STUDIES 624:

Qi Gong II

This course teaches the advanced awareness of energy pathways and flow, by experiencing one's own body movement and breathing, through continued work with forms of Qi Gong. Prerequisite: AMR 613 Qi Gong I
0 lecture hours, 2 laboratory hours, 1 semester credit

MOVEMENT AND RESPIRATION STUDIES 715:

Oriental Massage I.

The student will learn Tui Na soft tissue manipulation technique as well as its history, theory, application, and indications. Treatment of childhood illness will be the main focus. In addition, therapeutic techniques for the shoulder, neck abdomen, back pain and headaches will be covered. Prerequisite: ATD 513 Oriental Diagnosis I.
1 lecture hour, 2 laboratory hours, 2 semester credits

MOVEMENT AND RESPIRATION STUDIES 726:

Oriental Massage II.

Shiatzu, deep tissue massage and other forms of Oriental massage will be covered. Treatment plans for major musculoskeletal and gastrointestinal diagnoses will be covered. Prerequisite: AMR 715 Oriental Massage I
1 lecture hour, 2 laboratory hours, 2 semester credits

Acupuncture

Clinical Services (ACS)

CLINICAL SERVICES 631:

Clinical Internship I.

Under the supervision of licensed faculty members the interns administer care to patients. All patient diagnoses and management plans are reviewed and approved by a clinic faculty member prior to the initiation of patient care. The student will begin to practice clean needle technique, removal and disposal of needles. The student will acquire proficiency in tongue and pulse diagnosis. Prerequisite: Pass Clinical Exam

*0 lecture hours, 12 laboratory hours,
8 semester credits*

CLINICAL SERVICES 712:

Clinical Internship II.

Students continue to administer care to patients under the supervision and approval of licensed faculty. Students are monitored as to their progress towards completing the qualitative and quantitative requirements as set forth by the Master of Science in Acupuncture degree program. Prerequisite: ACS 631 Clinical Internship I

*0 lecture hours, 12 laboratory hours,
8 semester credits*

CLINICAL SERVICES 723:

Clinical Internship III.

Students continue to administer care to patients under supervision of licensed faculty. Progress is monitored by faculty. Prerequisite: ACS 712 Clinical Internship II

*0 lecture hours, 12 laboratory hours,
8 semester credits*

CLINICAL SERVICES 711:

Preceptorship I

The students observe and administer care in established acupuncture facilities under the supervision of licensed physicians and acupuncturists. This exposure to a variety of clinical settings helps prepare the student for both private practice and integrative patient care. Prerequisite: Completion of all first year courses.

*0 lecture hours, 4 laboratory hours,
2 semester credits*

CLINICAL SERVICES 722:

Preceptorship II

This is a continuation of ACS 711. Students increase their clinical skills working under a variety of health care professionals.

Prerequisite: ACS 711

*0 lecture hours, 4 laboratory hours,
2 semester credits*

ACUPUNCTURE PRACTICE AND TECHNIQUES (APT)

ACUPUNCTURE PRACTICE AND TECHNIQUES 511:

Point Location I.

Therapeutic indications and treatment methods utilizing acupuncture and moxibustion are provided for each point. Instruction is given in the functional selection of points through the application of differential diagnosis of conditions. Instruction includes the use of five element points, xicleft, mu and shu points. Channels covered: lung, large intestine, stomach, spleen, heart, small intestine, urinary bladder, kidney and pericardium meridians. Prerequisites: ATD 513 Oriental Diagnosis I; NBS 511 Anatomy I.

*1.5 lecture hours, 1 laboratory hour,
2 semester credits*

ACUPUNCTURE PRACTICE AND TECHNIQUES 523:

Point Location II.

This is a continuation of the previous course and will focus on the triple warmer, gall bladder, liver, governing vessel, conception vessel and extra points. Additional instruction is given in regional point selection. Prerequisites: ATD 513 Oriental Diagnosis I, NBS 511 Anatomy I.

*1.5 lecture hours, 1 laboratory hour,
2 semester credits*

ACUPUNCTURE PRACTICE AND TECHNIQUES 512:

Meridian Theory.

Meridian theory is the basis of diagnosis and acupuncture treatment. This course is designed to provide the necessary instruction and training for the student to

be familiar with meridian theory including regular, extra and other meridian systems. Prerequisites: ATD 512 Oriental Theory, ATD 513 Oriental Diagnosis I.

2 lecture hours, 2 semester credits

ACUPUNCTURE PRACTICE AND TECHNIQUES 614:

Acupuncture Techniques I.

This course covers the basic principles of acupuncture treatment for diseases involved with different pathogenic factors, tissues and organs. Special point selection based on Root-Branch, Origin-End, Path of Qi, Five Element and Eight Parameter diagnoses will be covered. Indications and contraindications of moxibustion, scalp acupuncture and electrical acupuncture stimulation will be covered. Prerequisites: APT 511 Point Location I; APT 523: Point Location II.

*2 lecture hours, 2 laboratory hours,
3 semester credits.*

ACUPUNCTURE PRACTICE AND TECHNIQUES 625:

Acupuncture Techniques II.

This course covers functions, indications and needling methods of the Well, Spring, River, Sea, Source, Luo, Xicleft, Back, Shu, Front Mu and Lower He-Sea, Eight influential Eight Confluent and important crossing points. Continuing practice in needling, moxibustion and cupping techniques is included. In addition, the prevention and treatment of acupuncture complications is covered. Prerequisite: APT 614: Acupuncture Techniques I

2 lecture hours, 2 laboratory hours, 3 semester credits

ACUPUNCTURE PRACTICE AND TECHNIQUES 621:

Auricular Acupuncture:

This course compares and contrasts the two schools of Auricular acupuncture: French and Chinese. The student will learn the respective maps of the ear, clinical applications and treatment strategies. Prerequisite: APT 625: Acupuncture Techniques II

2 lecture hours, 2 semester credits

Chiropractic

Chiropractic

Anatomy

ANATOMY 511

Histology.

This course provides chiropractic students with an understanding of microscopic human anatomy at the cellular, tissue and organ level. A strong emphasis is placed on the association between histological structure and function of the skeletal, muscular and nervous systems.

*3 lecture hours, 2 laboratory hours,
4 semester hours*

ANATOMY 512

Functional Anatomy and Biomechanics I: Spine.

This course addresses the functional anatomy and biomechanics of the spinal column, ribs, and pelvis. Emphasis is placed on the relationship between the structure and function of the spinal column and its surrounding anatomical structures. Biomechanical principles are incorporated into the study of functional anatomy of the human musculoskeletal system. Instruction includes lecture, tutorials, dissection, prosection and the study of anatomical models.

*3 lecture hours, 4 laboratory hours,
5 semester hours*

ANATOMY 513

General Anatomy I: Viscera.

This course focuses on the anatomy of the organs plus the walls of the human thoracic and abdominopelvic cavities. The neurological and vascular relationships of these organs are discussed with emphasis on the clinical applications. Instruction includes lecture and laboratory with dissection, prosection, and models.

*3 lecture hours, 3 laboratory hours,
4.5 semester hours*

ANATOMY 514

Embryology I.

Embryology covers gametogenesis, fertilization and structural development. Normal development, clinical correlations

and common congenital abnormalities are presented. Emphasis is placed on the skeletal, muscular and nervous systems.

1 lecture hour, 1 semester hour

ANATOMY 525

General Anatomy II: Head and Neck.

This course is a regional study of the head and neck. In all regions, the functional relevance, musculature, vasculature, innervation and structural relationships are discussed. Clinical correlations relevant to the region are discussed. A major emphasis is placed on the study of the cranial nerves. There is a basic anatomical and functional study of special sense organs, but the brain and special sense organs are studied in detail in Neuroscience II. Instruction includes lectures, full dissection of the head and neck, presentation of prosections, study of the skull and models.

*3 lecture hours, 3 laboratory hours,
4.5 semester hours*

ANATOMY 526

Functional Anatomy and Biomechanics II: Extremities.

This course is a regional exploration of the appendicular system. Bones, muscle attachment and function, vasculature and innervation are discussed. Emphasis is on understanding function based on attachment and on innervation. Relevant clinical problems are presented. Instruction includes lectures, full dissection of the pectoral girdle, pelvic girdle and extremities, presentation of prosections, study of the bones and models.

Biomechanics II, the study of joint mechanics of the appendicular system is a subset of this course that includes muscle kinetics and gait analysis. Prerequisites: AN511, AN512, AN514.

*3 lecture hours, 4 laboratory hours,
5 semester hours*

ANATOMY 527

Embryology II.

This course is a continuation of AN514, Embryology I. Prerequisite AN514.

1 lecture hour, 1 semester hour

Biochemistry

BIOCHEMISTRY 511

Biochemistry, Metabolism, and Nutrition.

This course covers the biochemical principles involved in maintaining functional homeostasis.

*3 lecture hours, 2 laboratory hours,
4 semester hours*

Business Procedures

BUSINESS PROCEDURES 811

Hospital Procedures, Insurance and Office Management.

Students are taught the current procedural practices for the handling of insurance matters and the operation of an office. Students are also introduced to procedures and protocols used in hospital settings. Prerequisites: all courses semesters I-VII.

2 lecture hours, 2 semester hours

BUSINESS PROCEDURE 812

Small Business Management.

This course introduces the student to the business procedures and practices used in the successful operation of a business. Prerequisite: all courses semesters I-VII.

2 lecture hours, 2 semester hours

Chiropractic Skills and Technique

CHIROPRACTIC SKILLS AND TECHNIQUE 511

Chiropractic Examination Skills I: Palpation.

This lecture and laboratory course addresses the biomechanics and chiropractic assessment procedures of the spinal and pelvic joints. Students are introduced to the concepts of biomechanics as they relate to the kinematics and kinetics of the spine and pelvis and the structure and function of the tissues of the musculoskeletal system. This information is coupled with the diagnostic tools of static and motion palpation as they pertain to the assessment of spinal joint function.

*1 lecture hour, 2 laboratory hours,
2 semester hours*

Chiropractic

CHIROPRATIC SKILLS AND TECHNIQUES 522

Chiropractic Examination Skills II: Palpation.

This course is a continuation of CH511. Students continue to develop their skills of spinal assessment. Students are also introduced to the biomechanics and assessment procedures related to the extremities. Methods of spinal, soft tissue, and extremity assessment are reviewed and practiced. Prerequisites: CH511, AN512; Co-requisite AN526.

*1 lecture hour, 4 laboratory hours,
3 semester hours*

TECHNIQUE 611

Technique Procedures: Soft Tissue.

Students are introduced to the concepts of soft tissue diagnostic and treatment procedures. Differential diagnosis and case management of soft tissue lesions are presented.

*2 lecture hours, 2 laboratory hours,
3 semester hours*

TECHNIQUE 612

Technique Procedures: Full Spine Assessment and Manipulative Procedures.

This course introduces students to full spine adjustive procedures from occiput to the pelvis. The course begins with a review of biomechanics and assessment procedures presented in Technique 511 and 522. Selected spinal conditions are presented and discussed as it pertains to diagnosis, differential diagnosis and case management.

*2 lecture hours, 2 laboratory hours,
3 semester credits*

TECHNIQUE 623

Technique Procedures: Full Spine and Extremity Assessment and Manipulative Procedures.

This course is a continuation of Technique 612. Students continue to refine their assessment and adjustive skills and are introduced to additional adjustive procedures. Students are also introduced to extremity adjustive procedures. Selected spinal and extremity conditions are presented.

*2 lecture hours, 4 laboratory hours,
4 semester hours*

TECHNIQUE 714

Technique Procedures: Full Spine and Extremity Assessment and Manipulative Procedures.

Full spine and extremity assessment and adjustive procedures continue to be pre-

sented and practiced. Case management and differential diagnosis of various conditions are presented.

*2 lecture hours, 4 laboratory hours,
4 semester hours*

TECHNIQUE 725

Technique Procedures: Full Spine and Extremity Assessment and Manipulative Procedures.

Technique procedures, assessment procedures, and biomechanics are reviewed. Students continue to be introduced to new adjustive procedures.

*2 lecture hours, 4 laboratory hours,
4 semester hours*

TECHNIQUE 816

Chiropractic Case Management.

This course is a review of all techniques taught at UBCC. This course also serves as a critique course for other techniques utilized in practice. Case management utilizing various chiropractic technique approaches are discussed and critically evaluated. Prerequisites: all courses semester I-VII.

6 laboratory hours, 3 semester hours

Clinical Nutrition

CLINICAL NUTRITION 621

Clinical Nutrition I: Pathology and Assessment.

This course introduces the student to disease states and abnormal conditions due to biochemical deficiencies and abnormal metabolic states. Students are introduced to the methods of nutritional assessment through history and observation. Prerequisites: BC511, DX613, PH612, PA611.

2 semester hours, 2 semester hours

CLINICAL NUTRITION 712

Clinical Nutrition II: Treatment and Management.

This course is a continuation of CN621. Students are presented with abnormalities of a nutritional origin and begin to develop a treatment and management plan. Prerequisite: CN621.

2 semester hours, 2 semester hours

Clinical Services

CLINICAL SERVICES 721

Clinical Services I.

Students under the supervision of licensed faculty begin to administer care to patients at the UBCC Health Center. Students are introduced to the procedures and practices utilized by the health center through lectures and practical demonstrations. Students refine their skills in history taking, physical examination, radiology, technique, case management and clinical decision making. Prerequisites: all courses in semesters I- V.

*1 lecture hour, 4 clinic hours,
3 semester hours*

CLINICAL SERVICES 812

Clinical Services II.

Under supervision of licensed faculty interns administer care to patients. Each patient diagnosis and management plan is reviewed and approved by a clinic faculty member prior to the initiation of patient care. Students are assessed via evaluation by faculty. Prerequisites: all courses semesters I-VI.

25 clinic hours, 12.5 semester hours

CLINICAL SERVICES 823

Clinical Services III.

Interns continue to administer care to patients under the supervision and approval of licensed faculty. Interns are monitored as to their progress towards completing the qualitative and quantitative requirements as set forth by the UBCC Health Center. Assessment of an intern's clinical competency is performed by faculty. Prerequisites: all courses semesters I-VII.

25 clinic hours, 12.5 semester hours

CLINICAL SERVICES 824

Clinical Services IV.

Interns continue to administer care to patients under supervision of faculty. Progress is monitored by faculty.

25 clinic hours, 4 semester hours

Chiropractic

Diagnosis

DIAGNOSIS 521

Diagnostic Skills I: Case History.

This is a lecture and laboratory course in which students learn the skills to take an appropriate case history as it relates to a patient's complaint. Students are introduced to the methods of diagnostic reasoning and develop clinical decision-making skills. Prerequisites: CH511, AN512, PP512.

*1 lecture hour, 2 laboratory hours,
2 semester hours*

DIAGNOSIS 612

Diagnostic Skills II: Orthopedics and Neurology.

This lecture and laboratory course introduces students to the procedures necessary to examine the neuromusculoskeletal system. Normal and abnormal findings are presented and discussed. Emphasis is placed on students understanding of clinical anatomy and interpretation of positive tests and signs. Prerequisites: DX521, AN526, CH522, PP524.

*2 lecture hours, 4 laboratory hours,
4 semester hours*

DIAGNOSIS 613

Diagnostic Skills III: Physical Examination.

This lecture and laboratory course introduces students to the procedures necessary to examine the various systems of the body. Normal and abnormal findings are presented and discussed. Students continue to refine their history taking skills and development of diagnostic reasoning skills. Prerequisites: DX521.

*2 lecture hours, 2 laboratory hours,
3 semester hours*

DIAGNOSIS 624

Laboratory Diagnosis.

This course introduces the student to the appropriate ordering and interpretation of laboratory tests. Standard hematology, blood chemistry, and urinary studies will be fully explored. Functional laboratory studies including urinary challenges, salivary, and stool studies will be also be presented. The impact of abnormal results on human physiology, and their application to the diagnosis of pathological conditions, will be introduced in order to fully prepare the student for more advanced courses in differential diagnosis.

Prerequisites: DX613, PH612, PA611.
3 lecture hours, 3 semester hours

DIAGNOSIS 625

Diagnostic Skills IV: Orthopedics and Neurology.

This course is a continuation of the examination procedures learned in DX612. Students, through a problem-based format, develop the clinical reasoning skills to differentiate conditions affecting the neuromusculoskeletal system.

*2 lecture hours, 4 laboratory hours,
4 semester hours*

DIAGNOSIS 726

Clinical Diagnosis: Dermatology/Gynecology/Geriatrics.

This course presents the conditions and differential diagnosis of dermatological and gynecological conditions. Students are also made aware of the specific health care problems of the aged patient. Physiological effects of aging, as well as the common disorders of the elderly are presented, with an emphasis on the neuromusculoskeletal system. Prerequisites: all courses semesters I-V.

4 lecture hours, 4 semester hours

DIAGNOSIS 727

Maternal/Child Health.

This course introduces the student to the health care needs of the developing child and mother from conception to birth to childhood and adolescence. Complications of pregnancy, delivery, post-partum care, and the chiropractic management of the obstetrical patient are discussed. The examination, conditions and management of the pediatric patient are presented. Prerequisites: all courses semesters I-V.

*3 lecture hours, 3 semester hours
3 semester hours*

Differential Diagnosis

DIFFERENTIAL DIAGNOSIS D621

Differential Diagnosis I: Eyes, Ears, Nose and Throat.

This course presents the diagnosis and differential diagnosis of diseases and conditions related to the head, eyes, ears, nose and throat. Conditions that primarily affect these areas as well as conditions that

may refer to this area are presented. The management of these conditions is reviewed. Case studies are presented to aid students in the development of clinical reasoning skills. Prerequisite: PA611, AN525, DX613, DX624.

2 lecture hours, 2 semester hours

DIFFERENTIAL DIAGNOSIS 712

Differential Diagnosis and Treatment of Internal Disorders.

This course presents the skills and diagnostic reasoning necessary to differentially diagnose diseases and imbalances of the internal organs, to include the cardiovascular, pulmonary, gastrointestinal, genitourinary, and endocrine systems. This course reviews the concept of how these systems can refer pain to, and affect the functioning of, the neuro-musculoskeletal system, as well as how the neuro-musculoskeletal system can affect the functioning of these systems. The process of synthesizing patient historical data, physical examination findings, laboratory studies, and diagnostic imaging results is stressed in the deductive process of differential diagnosis. Treatment options and protocols are presented including conventional allopathic therapy, as well as scientifically-based complimentary therapies. The laboratory component of the course reviews and refines applicable physical examination skills and presents case studies and computer patient simulations to aid the student in attaining clinical reasoning skills. Prerequisites: DX613, AN513, PA622, PH612, DX624.

*4 lecture hours, 2 laboratory hours,
5 semester hours*

DIFFERENTIAL DIAGNOSIS D723

Differential Diagnosis III: Neuromusculoskeletal.

This course is a presentation of the diseases and conditions affecting the neuromusculoskeletal system. Disorders affecting the spine, extremities, central and peripheral nervous system are reviewed. Neurological and orthopedic testing are covered as they relate to the differential diagnosis of these systems. Function of the human locomotor system and how other systems can affect it are stressed. Prerequisites: DD723, DX612, DX624, PA622.

*4 lecture hours, 2 laboratory hours,
5 semester hours*

Chiropractic

Emergency Procedures

EMERGENCY PROCEDURES 711

Emergency Procedures.

Training in first aid principles is given in lectures and demonstrations dealing with the care of emergencies and accidental injuries. Treatment of wounds, fractures, poisoning, lacerations, shock, hemorrhages, heat exhaustion, drowning and burns is taught. Students are trained and receive certification in the administration of CPR.

*1 lecture hour, 2 laboratory hours,
2 semester hours*

Microbiology and Public Health

MICROBIOLOGY 621

Microbiology/Infectious Diseases.

This course introduces the student to the basic concepts of microbiology with emphasis on the structure, growth, metabolism and genetics of bacteria. Host-parasite relationships of representative bacterial, fungal, viral, and protozoan pathogens are examined. A survey of microbial diseases includes modes of transmission, symptoms, diagnosis, physical and chemical methods of disinfection, sterilization and treatment. Presentations include lecture, laboratory and case studies. Prerequisites: BC511, PH521, PH612
*4 lecture hours, 2 laboratory hours,
5 semester hours*

MICROBIOLOGY 712

Epidemiology/Public Health.

This course covers current environmental and public health concerns and issues. The course integrates health with diet, air and water pollutants, noise and substance abuse. It also compares community hygiene and industrial hygiene, defines epidemiology, and identifies major communicable and non-communicable diseases. Prerequisite MB621.
3 lecture hours, 3 semester hours

Neuroscience

NEUROSCIENCE 521

Neuroscience I.

This course focuses on the anatomy of the

nervous system with special emphasis on sensory and motor systems. However all areas of the central nervous system are discussed to give the student a broad understanding of brain function. Clinical correlations are made which are applicable to each region or system of the CNS. The laboratory section of the course includes presentation of dissections and discussion of case studies. Instruction includes lecture, case studies and demonstration of dissections in the laboratory. Prerequisites AN511, AN512, AN514.

*2 lecture hours, 2 laboratory hours,
3 semester hours*

NEUROSCIENCE 612

Neuroscience II.

This course is a continuation of NS521, with the focus on the physiology of the nervous system. The sensory and motor systems are discussed in detail. An emphasis is placed on the correlation of anatomical structure to physiological function and clinical dysfunction. The special sense organs and systems are studied in detail. The laboratory introduces students to neurological tests performed on patients, with an emphasis on understanding the underlying neuro-anatomy and neurophysiology that is the basis for these tests. Prerequisite: NS521, PP524, PH521, AN525.

*4 lecture hours, 2 laboratory hours,
5 credit hours*

Pathology

PATHOLOGY 611

Fundamentals of Pathology.

This course is a study of pathophysiological processes and the gross, microscopic, and clinical manifestations of disease. Basic processes of inflammation, repair, degeneration, necrosis, immune response, and neoplasia are presented. This course is also an introduction to diseases of the lymphatic, hematopoietic, and neuromusculoskeletal systems. Laboratory includes the study of gross and microscopic changes as well as clinical presentations of various diseases and functional disturbances. Prerequisites: All anatomy courses, PH521.

*2 lecture hours, 1 laboratory hours,
2.5 semester hours*

PATHOLOGY 622

Systems Pathology.

This course is a continuation of PA611. This course emphasizes the pathological basis of systemic diseases of the cardiovascular, respiratory, gastrointestinal, urogenital, endocrine, and renal systems. The gross, microscopic, and clinical manifestations of various disease processes are presented. Prerequisites: PA611, PH612.

*4 lecture hours, 2 laboratory hours,
5 semester hours*

Physiology

PHYSIOLOGY 521

Physiology I.

This course emphasizes the functions of cellular structures which regulate homeostasis as well as their role in cell division and genetic control of protein synthesis. Emphasis is placed on the role of the cell membrane in the control of cellular events, particularly the propagation of action potentials and their role in muscle contraction. The effects of the physiology of hormones, their role in homeostasis, and functional changes associated with homeostasis is considered. Prerequisites: AN511, BC511.

*2 lecture hours, 2 laboratory hours,
3 semester hours*

PHYSIOLOGY 612

Physiology II.

This course is the study of the physiology at the organ and systems level. Included is the study of the circulatory, respiratory, renal, cardiovascular, gastrointestinal, and urogenital systems. Also included is the study of the endocrine system and its interrelationships with various organs and systems. There is an integration of normal physiology with pathophysiology and clinical concepts. Prerequisites: PH521.

*4 lecture hours, 2 laboratory hours,
5 semester hours*

PHYSIOLOGY 713

Toxicology/Pharmacology.

This course is the study of drugs and chemicals and how they interact with the living organism. Pharmacology is a study of the sites, absorption, and metabolism of common drugs. Toxicology studies the adverse reactions of drugs and poisons. The therapeutic use and toxic effects of

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various drugs, chemicals, nutritional supplements and other substances are studied. Prerequisites: PH612, NS612, PA611.

3 lecture hours, 3 semester hours

Physiological Therapeutics

PHYSIOLOGICAL THERAPEUTICS 711

Physiological Therapeutics I.

This course is an introduction to the clinical use of heat, cold, high volt galvanism, interferential current, low volt galvanism, ultrasound, electrical muscle stimulation, diathermy, and paraffin. The student is instructed on the development of a clinical management plan utilizing adjunctive therapies.

*2 lecture hours, 2 laboratory hours,
3 semester hours*

PHYSIOLOGICAL THERAPEUTICS 722

Physiological Therapeutics II: Rehabilitation.

This course covers the rehabilitative management of injuries to the spine and extremities common to the practice of chiropractic. Prerequisite: PT711.

*2 lecture hours, 2 laboratory hours,
3 semester hours*

Principles and Practice

PRINCIPLES AND PRACTICE 511

Principles and Practice I: History and Philosophy.

This is a course in which the history of healing is traced from its known origins through discovery of chiropractic to the present day. The basic concepts of chiropractic philosophy are discussed, as well as their current interpretation and clinical significance. Particular emphasis is placed upon chiropractic as a distinct profession in the health care community.

2 lecture hours, 2 semester hours

PRINCIPLES AND PRACTICE 512

Principles and Practice II: Communicating the Chiropractic Philosophy.

This course builds upon the students knowledge of chiropractic philosophy and introduces the students to communicating a chiropractic approach to health and wellness. Students are instructed on how

to present the chiropractic principles and philosophical tenets to patients. Emphasis is also placed on how to effectively interact with patients as well as how to interact with small and large groups of people.

2 lecture hours, 2 semester hours

PRINCIPLES AND PRACTICES 513

Principles and Practice III: Ethics.

Students are introduced to various codes of behavior as they relate to patient relations, advertising, insurance reporting and professional and general personal behavior.

2 semester hours, 2 semester hours

PRINCIPLES AND PRACTICES 524

Principles and Practice IV: Subluxation Complex and Its Philosophical Concepts.

This course introduces students to the current concepts of the subluxation complex and how it is integrated with the science, art, and philosophy of chiropractic care. The course covers the various components of the subluxation complex, including biomechanical, pathophysiological, and neurological aspects. This information is correlated to the effects of chiropractic manipulation of the subluxation complex. Prerequisite: PP511, AN512.

2 lecture hours, 2 semester hours

PRINCIPLES AND PRACTICE 611

Principles and Practice VI: Critical Evaluation of the Literature and the Philosophy of Science.

This course introduces students to the review and appraisal of published literature in the health sciences. Students will be introduced to the common types of studies and specific methods of evaluating each type. Current published literature relevant to chiropractic is reviewed and critiqued. Students will be introduced to computer-based searches of the literature.

1 lecture hours, 1 semester hours

PRINCIPLES AND PRACTICE 622

Principles and Practice VII: Research Methods and the Philosophy of Science.

In this course students will expand their knowledge of types of published studies. With emphasis on methodology, instrumentation, statistics and computer-based searches of the literature. Students will complete a proposal for either a Senior Paper or a Research Thesis.

2 lecture hours, 2 semester hours

PRINCIPLES AND PRACTICE 715

Principles and Practice V: Jurisprudence.

This course introduces students to licensure laws, civil and criminal law, malpractice, negligence, patient abandonment, informed consent, and proper record keeping. Prerequisites: all courses in semesters I-IV.

2 lecture hours, 2 semester hours

Psychology

PSYCHOLOGY 711

Clinical Psychology.

This course is designed to familiarize students with current psychological theory and practice. Students are instructed in behavioral assessment and recognition of psychological disorders. Interviewing and counseling techniques are presented as well as criteria for appropriate referral of patients to providers of psychological services.

2 lecture hours, 2 semester hours

Radiology

DIAGNOSTIC IMAGING 521

Diagnostic Imaging I: Normal Anatomy.

This course introduces students to radiographic anatomy, variants, and congenital anomalies as they relate to the spine, pelvis, skull, viscera, and extremities. Concepts as they relate to image formation, film reading, and report writing are introduced. Prerequisites: AN512.

*1 lecture hour, 2 laboratory hours,
2 semester hours*

DIAGNOSIS IMAGING 612

Diagnosis Imaging II: Normal Anatomy.

This course is a continuation of DI521. Students continue to develop their skills of radiographic interpretation as they relate to normal anatomical structures of the various parts of the body. Prerequisite: DI521.

*1 lecture hour, 2 laboratory hours,
2 semester hours*

DIAGNOSTIC IMAGING 623

Diagnostic Imaging III: Bone Pathology.

This course introduces students to the clinical and radiographic manifestations affecting osseous structures due to neoplasia.

Chiropractic • Computer Engineering

sia, tumor-like conditions, metabolic and endocrine disorders, and normal variants. Students are introduced to special imaging as related to further evaluation of these conditions. Prerequisites: DI623, PA611, all anatomy courses.

*2 lecture hours, 2 laboratory hours,
3 semester hours*

DIAGNOSTIC IMAGING 714

Diagnostic Imaging IV: Arthritis and Trauma.

This course further develops students skills in the clinical and radiographic manifestations of osseous structures. Emphasis is placed on the interpretation and recognition of disorders due to inflammatory and non-inflammatory arthritides, and trauma. Special imaging as related to further evaluation of these conditions is presented. Prerequisite: DI623.

*2 lecture hours, 2 laboratory hours,
3 semester hours*

DIAGNOSTIC IMAGING 725

Diagnostic Imaging V: Chest and Abdomen.

This course covers the interpretation of normal and abnormal clinical and radiographic manifestations of the internal organs. The chest, heart, and abdomen are studied on plain film as well as advanced imaging examination procedures. Prerequisites: all previous DI courses.

*1 lecture hour, 2 laboratory hours,
2 semester hours*

DIAGNOSTIC IMAGING 726

Positioning and Physics.

This course covers the mechanics of x-ray production, film processing, x-ray factors, and radiation safety and protection for doctor and patient. Also covered is the placement and positioning of patients for the taking of x-ray studies. Students are introduced to the policies and procedures utilized by the UBCC Health Center.

*3 lecture hours, 2 laboratory hours,
4 semester hours*

DIAGNOSTIC IMAGING 827

X-Ray Review.

In a clinical setting, students are given a review in a case presentation style of various radiographic findings. Prerequisites: all courses semester I-VII.

2 laboratory hours, 1 semester hour

Research

RESEARCH 713

Thesis I.

Students working with their advisor will start work leading to their published Senior Paper or Research Thesis.

1 lecture hour, 1 semester hour

RESEARCH 724

Thesis II.

Students continue to work with their advisor on their Senior Paper or Research Thesis.

1 lecture hour, 1 semester hour

RESEARCH 815

Thesis III.

Students continue to work with their advisor and complete and publish their Senior Paper or Research Thesis.

1 lecture hour, 1 semester hour

Computer Engineering

COMPUTER ENGINEERING 408

Operating Systems.

Structure and design of computer operating systems. Synchronization of processes; deadlock avoidance; CPU management; file management; memory management; and device management. Prerequisite: Computer Science 102, Computer Engineering 312.

3 semester hours

COMPUTER ENGINEERING 410

Introduction to Computer Architecture.

Instruction set; datapath and controller design for computers. Design and analysis of a RISC processor including integer and floating point pipeline design. Cache and virtual memory design, interrupts and DMA. Prerequisite: Computer Engineering 312 or equivalent background.

3 lecture hours, 3 semester hours

COMPUTER ENGINEERING 447

Logic Synthesis Using FPGAs.

Logic design using textual design entry,

VHDL. Behavioral, structural and data flow descriptions. Technology-dependent vs. technology-independent design. CPLD, SRAM and antifuse technologies. Rapid prototyping and retargeting designs. A major design project. Prerequisite: Computer Engineering 315.

3 lecture hours, 3 semester hours

COMPUTER ENGINEERING 448

Introduction to VLSI Design.

Design and implementation of a very large scale integrated circuits. CMOS and BiCMOS technologies, basic topological structure of ICs, clocking characteristics, resistance, capacitance and power estimation, System-level design and implementation issues. Custom layout and verification using CAD tools. Synthesis of designs from VHDL descriptions. Term project will include the design and testing of an integrated circuit. Prerequisites: Computer Engineering 315 and Electrical Engineering 348.

3 lecture hours, 3 semester hours

COMPUTER ENGINEERING 460

Introduction to Robotics.

Basic Robotics, including: position and velocity sensing, actuators, control theory, robot coordinate systems, robot kinematics, differential motions, path control, dynamics, and force control. Robot sensing, simulation of manipulators, automation, and robot programming languages are also investigated. Prerequisites: Computer Science 102, Electrical Engineering 360, Math 214 or 314 or permission of instructor.

3 lecture hours, 3 semester hours

COMPUTER ENGINEERING 471

Data and Computer Communications.

Introduction to data communication. Frequency response, bandwidth, filtering and noise. Fourier series and Fourier transform. Information theory concepts: Nyquist's theorem, Shannon's and Sampling theorems. Analog and digital modulation techniques. Pulse Code Modulation (PCM). Communication systems circuits and devices. Data encoding. Physical layer protocols. Data link control (point to point communication, design issues, link management, error control, flow control). Multiplexing and switching. Prerequisite: Computer Science 102, Computer Engineering 210.

3 lecture hours, 3 semester hours

Computer Engineering

COMPUTER ENGINEERING 472

Computer Networks.

Introduction to computer networks. Circuits, message, packet and cell switching. WAN and LAN design issues. LAN standards. Network layer design issues. Routing and congestion control. Internetworking. ISDN, B-ISDN, and ATM. Transport layer design issues and protocols. Application layer design issues and protocols. Examples of protocol suites and networks. Prerequisite: Computer Engineering 471 or permission of instructor.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 473

Local Area Networks.

Introduction to Local Area Networks (LANs). Classes of LANs. LAN design issues. LAN topologies. LAN transmission media. LAN protocols: Medium Access Control (MAC) and Logic Link Control (LLC). LAN standards. Network software. Network operating systems. LAN performance modeling and analysis. Internetworking: Bridges, Routers and Gateways. Reliability, availability, survivability and security. Prerequisite: Computer Engineering 471.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 481

Mobile Communications.

This course covers the basic technologies in the field of wireless and mobile communications. The following topics are covered in the course: wireless transmission, media access control, satellite systems, broadcast systems, wireless LANs, wireless ATM, network layer protocols, transport protocols and support for mobility. Prerequisites: Computer Engineering 471 or Computer Engineering 473 and permission of instructor.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 489

Software Engineering.

Structural development methodology for large software systems. Planning requirements, design, test, and validation. Advanced topics in software development. Prerequisite: Computer Science 102 and senior status.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 500

Graduate Co-op in Computer Engineering.

By arrangement.

1 semester hour

COMPUTER ENGINEERING 540

Image Processing.

This is a project-oriented course. Students will learn and implement FFT with applications, image enhancement, image restoration, image compression, and image tomography. Projects will be conducted on workstations. Prerequisite: Electrical Engineering 443.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 550

Advanced VLSI Design.

Implementation of custom VLSI designs, digital and analog simulation, fault tolerant design, design for testability. A major project will include the implementation of a digital integrated circuit. Prerequisites: Computer Engineering 448D.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 560

Performance Evaluation and Analysis.

This course covers the basic theory and practice of computer systems performance evaluation. The course focuses on three major aspects of performance analysis, measurement, simulation and analytical modeling using queuing theory. The topics will include measurement techniques, monitor tools, simulation models, stochastic processes, queuing theory and analytical modeling techniques. Prerequisites: Background in computer architecture and Probability and consent of the instructor.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 561

Network Security.

Conventional encryption and message confidentiality, public-key cryptography and message authentication. Authentication applications, electronic mail security, IP security, web security, firewalls, security in mobile network and other security systems. Prerequisites: Computer Engineering 471 or 473.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 570

Advanced Robotics.

Advanced robotics and automation topics

and techniques, including: active robotic sensing, intelligent and integrated manufacturing systems, robotic inspection, observation under uncertainty, multisensor feedback control of manipulators and mobile robots, advanced simulation and monitoring of robotic systems, high level modeling and control, and other topics. Prerequisites: Computer Science 460, Computer Engineering 460 or permission of instructor.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 584

Machine Perception.

An introduction to sensing and machine vision. Vision algorithms that are usable in practical applications, sensing mechanisms and various types of sensed data representation, sense data processing and interpretation for different applications. Prerequisites: Computer Science 400, Computer Engineering 312 and Electrical Engineering 443.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 585

Computer Vision.

A project-oriented course designed to familiarize the student with the computer image display, processing, and various limitations. The processing includes edge detection, Hough transform, thinning algorithms, moment invariant methods, relaxation algorithms, among others. Prerequisite: Computer Science 400, Computer Engineering 312, Electrical Engineering 443.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 588D

Interactive Computer Graphics.

Introduction to interactive computer graphics in computer-aided design. CRT display techniques; programming and graphic display principles; 2-D and 3-D display methods; command and programming languages for graphics. Term project using interactive display device is required. Prerequisites: Computer Engineering 312 and Computer Science 400.

3 lecture hours; 3 semester hours

COMPUTER ENGINEERING 597

Advanced Problems in Computer Engineering.

Lecture hours, semester hours and topics to be arranged with Department Chair.

Computer Engineering • Computer Science

COMPUTER ENGINEERING 598

Thesis in Computer Engineering.

Lecture hours, semester hours and topics to be arranged with Department Chair.
1-6 semester hours

COMPUTER ENGINEERING 599

Independent Study in Computer Engineering.

Independent study of advanced topics in Computer Engineering and submission of project report as required. Problem assignment and semester hours to be arranged with and approved by the Department Chair.

Computer Science

COMPUTER SCIENCE 400

Object-Oriented Programming Using C++.

This course introduces the modern object-oriented programming philosophy using C++ to the beginning graduate students. The emphasis is on developing the programming thought process in terms of objects and their interactions to each other. Concepts covered include data hiding, code reuse through inheritance, polymorphism, templates, exception handling, developing appropriate class hierarchy and code maintenance for large software projects. Prerequisites: Computer Science 102 or equivalent background.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 410

Java Programming.

Object oriented programming, using Java, packages, interfaces, multi-threading, classes, inheritance, exceptions, interfaces, native methods, applets. Prerequisite: Computer Science 400.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 411

Advanced Object-Oriented Programming with JAVA.

Covered topics include advanced features of Java, such as Database inter-connectivity (JDBC) with Servlets and JSP, remote method interface (RMI), distributed applications objects using CORBA and JNDI, Java Beans, introspection and reflection, Enterprise Java applications with EJB, interfacing Java to C++ with JNI, and additional advanced topics. A focus on

developing components and packages. A major project is developed. Prerequisite: Computer Science 410.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 435

Unix System Programming.

Introduction to shell programming and system programming languages in the Unix environment. Files, directories, filters, processors, queues, semaphores. A major project focuses information towards a particular application. Prerequisite: Computer Science 400.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 440

Windows Programming.

This course covers Graphical User Interface (GUI), design and Windows programming using Visual C++ and Microsoft Foundation Class (MFC) library. Topics covered include windows architecture, message/event driven programming, designing Dialog based, SDI and MDI applications, Document/View architecture, Device Contexts, Database access using the MFC ODBC classes and ADO. A comprehensive project is assigned towards the end of the course, which cover important windows programming concepts. Prerequisite: Computer Science 400.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 450

Data Base Design.

Survey of data structures used in data bases; relations; hierarchical and network data models; theoretical issues in data base processing; practical issues in data base design, programming, and implementation. Prerequisite: Computer Science 400.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 460

Introduction to Robotics.

Basic robotics including: position and velocity sensing, actuators, control theory, robot coordinate systems, robot kinematics, differential motions, path control, dynamics and force control. Robot sensing, simulation of manipulators, automation and robot programming, languages are also investigated. Prerequisite: Computer Science 102, Math 214 or 314, or permission of instructor.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 500

Graduate Co-op in Computer Science.

By arrangement.
1 semester hour

COMPUTER SCIENCE 502

Analysis of Algorithms.

A course in advanced data structures and high-level algorithms. Varied uses of recursion. Graph representations and algorithms including traversals, path finding, closure, and spanning trees. Sorting files. Weighted and balanced trees; Hashing and collision handling. Complexity and analysis of algorithms. Prerequisite: Computer Science 102 or equivalent.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 503

Operating Systems.

An advanced implementation-oriented course in structure and design of operating systems. Scheduling and time management; processes and operating systems primitives; Deadlock handling techniques in operating systems; Space management and external device management. Prerequisite: Computer Science 102, Computer Engineering 312, Knowledge of C/C++.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 504

Artificial Intelligence.

Foundations of the theory of Artificial Intelligence. Game playing, pattern recognition, description of cognitive processes, heuristic decision procedures, general problem solvers. Learning and robotics. Discussion of the relationship with human thought process. Extensive Lisp programming. Prerequisite: Computer Science 102 or permission of instructor.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 505

Introduction to Expert System Design.

Principles and techniques of rule-based expert systems; knowledge representation, rule design, and inference engine control. Types of expert systems: diagnosis, synthesis, and planning. Commercial expert systems. Prerequisite: Computer Science 102, 504.

3 periods; 3 semester hours

COMPUTER SCIENCE 509

Automata Theory.

Theory of automata and learning machines.

Computer Science

Finite-state sequential machines and functions. Transition preserving functions, Generators and minimal generating sets. Input semigroup, Isomorphisms and Automorphisms. Prerequisite: Computer Science 227. *3 lecture hours; 3 semester hours*

COMPUTER SCIENCE 520

Theory of Computation.

Finite automata and Pushdown automata; Register machines; Recursive functions and sets; Languages, regular expressions; Context-free languages; Regular and context-free grammars; Pumping lemmas. Turing machines, Church-Turing thesis. Post-correspondence problem; Computability and complexity. Prerequisite: Computer Science 227 and knowledge of computer programming.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 545

Component Based Software Design

Modern component based software design approaches using both the Component Object Model (COM) as well as the CORBA technologies. In-depth look at the infrastructure of COM components presenting of concepts of class factories, interfaces (standard and custom), in-proc and local server components, IDL, type libraries, proxy/stubs and marshalling, automation and IDispatch interface, structured storage and ActiveX controls. The distributed form of COM referred to as DCOM and its newest form is known as COM+, which integrates the transaction, and queuing capabilities are examined. A comparison of the CORBA technology is made by explaining its architecture and remoting capabilities. Prerequisite: Computer Science 440. Prerequisite by topic: 1. Good background in C++ programming, 2. Some knowledge of Windows Programming.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 551

Advanced Database.

Advanced study of Relational databases including primary and secondary indexing techniques, query optimization, transactions and concurrency, recovery techniques, security, a relational algebra, cost of execution, query transformation, rule and cost-based optimization. Introduction to distributed relational databases including distribution methods, distributed queries optimization. Introduction of Ob-

ject-Relational and Object database models and query languages.

Prerequisite: Computer Science 450

3 lecture hours, 3 semester hours

COMPUTER SCIENCE 555

Web-Based Application Development

Introduction to fundamental issues in designing a web-based application. Review of the web technologies such as HTML, VBScript, JavaScript, DHTML, Java, XML and server-side technologies using Active Server Pages (ASP), CGI and Java Server Pages (JSP). Design issues include the creation of tiered and scalable applications by the use of COM+ components involving Microsoft Transaction Server and the Java approach of Enterprise Java Beans. Different projects are assigned to create dynamic, database-driven E-Commerce solutions involving, order tracking systems, inventory management, advertising management, creating score reports, personalizing the shopping experience and secure credit card transactions. Wireless E-Commerce applications and developing business-to-business application using XML, SOAP and Biztalk Servers. Prerequisite: Computer Science 400.

3 lecture hours, 3 semester hours

COMPUTER SCIENCE 560

Performance Evaluation and Analysis.

This course covers the basic theory and practice of computer systems performance evaluation. The course focuses on three major aspects of performance analysis, measurement, simulation and analytical modeling using queuing theory. The topics will include measurement techniques, monitor tools, simulation models, stochastic processes, queuing theory and analytical modeling techniques. Prerequisite: Background in computer architecture and probability and consent of the instructor.

3 lecture hours, 3 semester hours

COMPUTER SCIENCE 561

Network Security.

Conventional Encryption and Message Confidentiality, Public-key Cryptography and Message Authentication. Authentication Applications, Electronic Mail Security, IP Security, Web Security, Firewalls, Security in Mobile Network and other Security Systems. Prerequisite: Computer Engineering 471 or 473.

3 lecture hours, 3 semester hours

COMPUTER SCIENCE 570

Advanced Robotics.

Advanced robotics and automation topics and techniques, including: active robotic sensing, intelligent and integrated manufacturing systems, robotic inspection, observation under uncertainty, multisensor feedback control of manipulators and mobile robots, advanced simulation and monitoring of robotic systems, high level modeling and control, and other topics. Prerequisites: Introduction to Robotics (Computer Science 460 or Computer Engineering 460).

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 580

Introduction to Neural Networks.

Introduction to neural computing, and fuzzy logic. Neural network models including feedforward, multilayered networks, back-propagation, fuzzy associative memories, self-organizing maps and adaptive resonance. Applications. Projects to implement networks designed for specific applications. Prerequisite: Proficiency in C or C++, calculus and matrix methods.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 584

Machine Perception.

An introduction to sensing and machine vision. Vision algorithms that are usable in practical applications, sensing mechanisms and various types of sensed data representation, sense data processing and interpretation for different applications. Prerequisite: Computer Science 400, Computer Engineering 312.

3 lecture hours; 3 semester hours

COMPUTER SCIENCE 590

Parallel and Distributed Processing.

Models of parallel computation including distributed, multiprocessor, multicomputer. Parallel programming constructs. The mutual exclusion problem, synchronization and communication methods. Multi-computer topologies and topologies and topological embedding. Classes of parallel algorithms and design approaches. Performance analysis of parallel computation, including detailed and high level. A major project is required. Prerequisite: Computer Science 400.

3 lecture hours; 3 semester hours

Computer Science • Counseling

COMPUTER SCIENCE 597

Advanced Problems in Computer Science.
Lecture hours, semester hours and topics to be arranged with Department Chair.

COMPUTER SCIENCE 598

Thesis in Computer Science.
Lecture hours, semester hours and topics to be arranged with Department Chair.
1-6 credit hours

COMPUTER SCIENCE 599

Independent Study in Computer Science.
Independent study of advanced topics in Computer Science and submission of project report as required. Problem assignment and semester hours to be arranged with and approved by the Department Chair.

COMPUTER SCIENCE 604

Advanced Artificial Intelligence (AI) Concepts.
Advanced topics in AI; natural language processing and learning simulated using an AI language (e.g. LISP) while planning will be implemented directly on robots in the AI lab. Integration of AI techniques into a working system. Prerequisite: Computer Science 505.
3 lecture hours; 3 semester hours

COMPUTER SCIENCE 605

Advanced Expert System Design.
Principles and techniques of complex expert systems. Uncertainty, alternate knowledge representations, and inference engine design. Each student will be required to design and debug a complex expert system of his/her own choosing. Prerequisite: Computer Science 504.
3 lecture hours; 3 semester hours

Counseling

COUNSELING 505

Helping Relationships.
This course provides a definitive view of counseling including the characteristics of the counselor and the elements of the counseling process. Through experiential exercises and videotaped simulated counseling the student will attain the skills

of attending, empathic listening and focusing on important client concerns.
3 semester hours

COUNSELING 510

The Counselor as Professional.
This course serves as an orientation to the helping profession addressing issues that impact on the provision of services. Included will be a survey of work settings, diverse populations, professional organizations certifications, ethics and law.
3 semester hours

COUNSELING 516

Social and Cultural Foundations of Counseling.
This course examines how social and cultural factors impact on the individual and subsequently how the counselor attends to and addresses the different social forces and cultural differences.
3 semester hours

COUNSELING 521

Group Process, Application and Theory.
The course will focus on the dynamics of leadership and various membership roles and alternative theoretical models of groups will be studied. An experiential group experience is required.
3 semester hours

COUNSELING 522

Career and Lifestyle Development.
This course provides an introduction to a lifespan approach to career and lifestyle development. Students explore theories, research, and counseling strategies related to career and lifestyle issues. Labor market resources and information, career assessment tools, computer assisted career guidance, life roles, gender and cultural considerations, and placement procedures are reviewed as interrelated factors to the study of career development.
3 semester hours

COUNSELING 523

Counseling Theories.
This course surveys the major theories of counseling including the Psychoanalytic, Behavioral, Humanistic, Cognitive and Systems approaches. The student will gain an understanding of the role of theory, the philosophical basis of the theories, the divergent methods utilized, and the utility

of each perspective.
3 semester hours

COUNSELING 524

Strategies and Techniques of Counseling.
Building on basic listening skills this course focuses on developing strategies and interventions that promote therapeutic movement for the client. Techniques of the various theoretical orientations will be presented and practiced. Simulated role plays and videotaped sessions provide active opportunities to develop the skills.
3 semester hours

COUNSELING 525

Appraisal Procedures for Counselors.
The student will become familiar with a variety of standardized assessment instruments, learn how to evaluate them, select several tests that are appropriate for use in an area of professional responsibility related to a real or anticipated counseling situation, and interpret test results in a supervised setting.
3 semester hours

COUNSELING 526

Drug Counseling.
This course is designed to provide a practical experience for counselors learning to work with drug abusers, alcoholics, and those who are prone to drug and alcohol abuse. A didactic segment of the course is designed to provide the student with background information to make his/her experience more meaningful. Lectures by former addicts and alcoholics, people familiar with pharmacology and those understanding legal aspects of abuse will be part of the course. There will also be a sharing of experience among members of the class who will practice counseling skills in small groups.
3 semester hours

COUNSELING 527

Foundations and Contextual Dimensions of Gerontological Counseling.
A foundation course introducing students to the history and philosophy of gerontological counseling. All services and professional issues are considered through the normative experiences of aging related to the social, psychological, physical, cultural, and spiritual changes occurring during the older adult years. A discussion of common impairments is also included. Foun-

Counseling

dation topics include settings, roles and functions, ethical and legal issues, professional organizations, and diversity issues. Contextual dimension topics include types of delivery systems, support networks, community care options, social service needs, and assessment strategies for working with older adults.

3 semester hours

COUNSELING 528

Gerontological Counseling Techniques and Methods.

Studies related to common impairments for older persons like chronic illness, Alzheimer's disease, substance abuse, depression and suicide, sexual dysfunction/alternatives, and problems with prescription medications are presented in detail. Counseling strategies shown to be effective with older adults, both from a developmental/wellness and impairment perspective, are included within a framework of gender and cultural considerations. Counseling strategies might include life review, family counseling, group work, creative arts therapies, grief and loss counseling, wellness interventions, and psychoeducational and social network interventions. Students are expected to practice via role plays the strategies reviewed in class.

3 semester hours

COUNSELING 529

Mid-Life Counseling.

This course focuses on the mid-life client who, historically, has been neglected in theory, practice and general concern of professionals in counseling and related fields. Special problems and needs of the mid-life person are explored in the context of the human growth and development process over the total life span. Through class experiences, students will develop counseling procedures appropriate for this age group and their specific issues.

3 semester hours

COUNSELING 531

Computer Applications in Counseling and Human Resources.

Students will be provided hands-on experience with computer programs useful to counselors and human resource developers in a variety of work and study

environments. Programs useful within the contexts of other courses required in the counselor preparation program will be introduced. Software samples relevant to a variety of counseling settings will be studied and evaluated.

2 semester hours

COUNSELING 566

Psychopathology.

This course covers a survey of maladaptive behavioral patterns and disorders, assessment of client functioning and need, and differential therapeutic responses. The student will gain an understanding of psychopathology (with emphasis on those syndromes most frequently encountered by counselors), diagnostic procedures and treatment goals. They will be able to identify and differentiate between major areas of psychological disorders and be able to respond to them appropriately.

3 semester hours

COUNSELING 575E

Supervised Practicum.

The student will participate for 2 semesters in an intensive supervised clinical experience in selected social agencies, counseling centers, educational institutions and business settings. Prerequisites: Successful completion of required courses and permission of the Department. By arrangement.

1-6 semester hours

COUNSELING 575H

Internship.

The student will participate for two semesters in a supervised field experience in selected business settings open to Human Resource Development students only. Prerequisite: All core courses and permission of the Department.

1-6 semester hours

COUNSELING 575E

Supervised Practicum.

The student will participate for 2 semesters in an intensive supervised clinical experience in selected social agencies, counseling centers, educational institutions and business settings. Prerequisites: Successful completion of required courses and permission of the Department. By arrangement.

1-6 semester hours

COUNSELING 575H

Internship.

The student will participate for two semesters in a supervised field experience in selected business settings open to Human Resource Development students only. Prerequisite: All core courses and permission of the Department.

1-6 semester hours

COUNSELING 580D

Special Problems of Counseling.

Courses designed to allow the student the opportunity to select a topic for study which is both relevant to the counseling and guidance field and important to the student's professional development. By arrangement.

1-6 semester hours

COUNSELING 590

Master's Project.

A course designed to assist the student in development of the "product of excellence" which is the final product required for completion of the Master's degree in Counseling.

1 semester hour

COUNSELING 621B

Seminar and Field Experience in Student Personnel Work.

A professional level experience in one or more student personnel service offices whereby the student is provided the opportunity to assume duties and responsibilities related to the organizational, administrative and research aspects of student personnel work. In addition to the minimum of five class hours per week of supervised field experience, regular weekly sessions are held for all participating students in which field experiences are shared and relevant competencies developed.

3 semester hours

COUNSELING 622

Group Work Processes and Skills.

A laboratory and seminar course in which students will become actively involved in working with small groups. Emphasis in the supervised group and seminar sessions will be on the leader's role as a facilitator of individual growth within the group setting. Prerequisite: Counseling 621, 523, 524, or departmental permission.

3 semester hours

Counseling • Education

COUNSELING 623

Counseling and Consultation Skills.

This course explores the role and implications of the consultative process in various settings: with co-workers, with individuals and groups, with organizations and institutions. Participants will have an opportunity to increase skills in the consultative process; to exchange experiences, problems and concepts in practice on consultation; and to increase the number of alternatives one may use in the consultative process. By experiencing and learning from an actual consulting assignment, each participant will have an opportunity to be more aware of self and increase the congruence between personal and professional life.

3 semester hours

COUNSELING 624

Group Strategies and Techniques for Developing Human Potential.

Advanced treatment of the application of human relations skills and strategies in a workshop setting. Each participant will contract to develop specific skills in a minimum of one approach up to a maximum of six approaches from such areas as reality therapy, transactional analysis, psychodrama, gestalt, bioenergetics, Otto's human potential or other approaches. Prerequisite: Permission of instructor.

1-6 semester hours

COUNSELING 627

Life Work Planning.

This course will provide opportunities to examine and share various career planning modules that can be used in a variety of settings. Participants will have the opportunity to experience one model in particular, Life Work Planning. The Life Work Planning experience is divided into two sections: Phase I encourages greater client self-awareness through various exercises and group interaction; Phase II provides clients with a variety of proven decision and planning tools. With these tools, clients can clarify their goals, decisions and plans; test their present direction; seek new directions; look for alternatives; and move toward action and greater control. Life Work Planning links clients' present realities with personal growth. Throughout the experience, they work alone, or in a sub-group of four or five people. The exercises and tools can

be used again throughout their lives to focus attention on their position in a world of change.

3 semester hours

COUNSELING 680D

Advanced Seminar in Counseling.

By Arrangement. Offered upon student demand.

1-6 semester hours

Education

Note: ModMAP courses are designated with the prefix of EDMM. Specific titles are listed with the programs of study in the chapter for graduate studies in the School of Education and Human Resources. Consult the division faculty for detailed course descriptions.

EDUCATION 348 C, M

Directed Observation and Supervised Teaching in the Elementary or Middle School.

This is a full-time field experience in a selected elementary or middle school. This meets requirements of Connecticut's BEST program. PRAXIS I must be passed. Department permission is required.

6 semester hours

EDUCATION 392

Directed Observation and Supervised Teaching in Secondary Schools.

This is a field experience in selected secondary schools. This meets requirements of Connecticut's BEST program. Department permission is required. PRAXIS I must be passed.

6 semester hours

EDUCATION 440

Methods and Materials in Teaching Language Arts.

This course focuses on the teaching and learning of the English language arts with an emphasis on instructional planning and assessment using current state and national standards.

ED 440C concentrates on the language arts processes and practices implemented in the elementary-level curriculum, grades 1-6.

ED 440M concentrates on the language arts processes and practices for middle school

settings, grades 4-8, with an emphasis on interdisciplinary connections.

ED 440J concentrates on the issues and pedagogy of teaching the English language arts and literature in secondary-level settings, grades 7-12.

3 semester hours

EDUCATION 441

Methods and Materials in Teaching Mathematics.

This course deals with methods of teaching mathematics. Materials are examined for their use in diagnosis, remediation and enrichment.

ED 441C concentrates on the scope and sequence, as well as appropriate activities, for the 1-6 level.

ED 441M concentrates on the appropriate practices for middle school, grades 4-8, with an emphasis upon interdisciplinary connections.

ED 441J concentrates on the content and methodology of mathematics for secondary students.

ED 441 C — 2 semester hours

ED 442 M, J — 3 semester hours

EDUCATION 442

Methods and Materials in Teaching Social Studies.

This course assists students in developing competencies in unit planning, instructional strategies, and the utilization of diverse materials and technology for teaching the social studies. Students design courses of study that integrate state and national standards; contemporary thinking about the teaching of social studies is stressed.

ED 442C concentrates on the activities, planning, and materials for social studies in elementary classrooms, grades 1-6.

ED 442M concentrates on the content, practices, and planning appropriate for the middle level, grades 4-8. Interdisciplinary possibilities are examined.

ED 442J concentrates upon appropriate content, planning, and practices for 7-12 classrooms.

ED 442 C — 2 semester hours

ED 442 M, J — 3 semester hours

Education

EDUCATION 443

Methods and Materials in Teaching Science.

This course introduces teaching approaches, instructional materials, and contemporary thinking about science education.

ED 443 C concentrates upon the practices and materials of effective science for grades 1-6.

ED 443 M concentrates upon the appropriate content and practices for the middle grades, 4-8. Interdisciplinary possibilities are examined.

ED 443J concentrates upon the appropriate content and practices for the secondary science curriculum.

ED 443 C — 2 semester hours

ED 443 M, J — 3 semester hours

EDUCATION 445

Methods and Materials of Teaching Business.

This course focuses on various purposes of the business curriculum in a school setting. It examines the range of teaching strategies and materials for classroom practices.

3 semester hours

EDUCATION 446

Methods and Materials in Teaching a Foreign Language.

This course familiarizes the student with the major purposes of the study of foreign language in the schools. It introduces the strategies and classroom activities for effective teaching. It examines appropriate materials for teaching foreign languages.

3 semester hours

EDUCATION 447

Methods and Materials of Teaching English as a Second Language.

This course explores the language needs of children who are learning English as a second language. It reviews and explains effective methods and strategies for teaching such students. The most appropriate materials are identified and utilized.

3 semester hours

EDUCATION 448

Methods of Teaching Art in the Public Schools.

This course focuses on the range of methods appropriate to teaching art in elementary, middle and secondary levels. Demonstrations and hands-on practice are

core experiences.

3 semester hours

EDUCATION 449

Materials and Techniques for Teaching Art in the Public Schools.

This course focuses on art and craft media, techniques and procedures for the prospective art and classroom teacher which are presently offered within the art curriculum of public schools. These include drawing and painting, printmaking, silk screening, enameling and others depending upon the background and experience of individual students.

3 semester hours

EDUCATION 450

Field Experience.

This course is a structured observation in a public school. The goals of the course are to facilitate the students awareness of self, of school pupils, and of prospective teachers. The course is an elective for other majors. The number of semester hours taken should be determined with the student's advisor.

1-6 semester hours

EDUCATION 500

Research Techniques and Report Writing.

This is an introduction to the research process, to the understanding of published research, and to the application of research findings to education. The course prepares the student to write formal papers and research reports.

3 semester hours

EDUCATION 502

Historical Foundations of Education.

This is an examination of basic philosophical problems which underlie the educational questions that confront society. The aim is to provide a foundation upon which a critical understanding of fundamental questions of modern culture and education can be developed.

3 semester hours

EDUCATION 504

Comparative and International Education.

This is a comparative study of educational policies and practices in selected countries throughout the world. Global problems like peace, social and economic justice, and environmental quality are examined with a view to promoting global aware-

ness in American education.

3 semester hours

EDUCATION 505

Intercultural Relations: Teaching and Learning in Multicultural Environments.

This course presents an overview of theories about educational, social and cultural problems of minority culture students, about teacher perceptions and expectations, about parental involvement. The course also critically analyzes policies and practices of multicultural and bilingual education. The thrust of the course is to develop appropriate and non-biased methods of teaching all children.

3 semester hours

EDUCATION 509

Psychological Foundations In Education.

This is concerned with the work of educators in general and teachers in particular. Topics include student characteristics (personality, growth, and development, adjustment, etc.) motivation, learning, measurement and evaluation, objectives, and teaching methods.

3 semester hours

EDUCATION 510

Internship Training.

This is conducted with a team of faculty in a series of training workshops to prepare Interns to undertake successful field experiences.

2 semester hours

EDUCATION 511A

Health.

This course addresses the issues of alcohol, nicotine or tobacco, drugs and acquired immune deficiency syndrome. Techniques and strategies for teaching about these subjects are presented.

.5 semester hour

EDUCATION 511B

Intergroup Relations

This course addresses the topics of intergroup relations, mental health and school violence prevention and conflict resolution components. Issues for teachers concerning toleration and respect among groups of people, youth suicide, child abuse and ways of preventing school violence will be discussed.

.5 semester hour

Education

EDUCATION 515

Clinical Experience—Internship Program.

Interns will work under supervision in a learning environment, providing a variety of paraprofessional services to the schools.
3 semester hours

EDUCATION 516

Internship II.

Internship II is designed for interns in the teacher certification track and it provides (1) a more indepth perspective of teaching and learning through the development of a portfolio and (2) an opportunity to reflect on and document the impact of the internship experience.
3 semester hours

EDUCATION 530

Child Growth and Development

This course is an investigation of child growth and development with emphasis on the implications for school-aged children. The needs, problems, and characteristics of children from infancy to adolescence are discussed. Social, emotional, cognitive physical and language developments are stressed.
3 semester hours

EDUCATION 536

Adolescent Literature.

This surveys books and periodicals emphasizing criteria for selection and evaluation, procedures for establishing a program of literature in the schools, and opportunities to explore the interpretation of literature in the classroom through drama, story telling, book reporting, and choral speaking. For certification, Education 536C is focused on children's literature. Education 536J concentrates on adolescent literature. Education 536M concentrates on a pre-adolescent literature.
Educ 536C – 2 semester hours
Educ 536M/J – 3 semester hours

EDUCATION 540

American Culture and Education.

This course addresses cultural issues related to education. Topics include multicultural issues in America and the interpretation of demography in relation to schooling. The search for national identity and educational alternatives are explored.
3 semester hours

EDUCATION 541

Classroom Management in Teaching English as a Second Language.

This course focuses on classroom management as an effective tool for a positive learning environment. Planning, implementing, and maintaining management procedures are discussed.
2 semester hours

EDUCATION 542

Theory and Methods of Teaching English as a Second Language.

This course addresses the foundations of second language learning theory, research, and discourse in educational settings. It also focuses on strategies for teaching dual language instruction with emphasis on a culturally responsive environment and on legal issues as they apply to schooling for English language learners.
3 semester hours

EDUCATION 543

Second Language Acquisition.

This course provides an overview of the major theories of first and second language acquisition. It applies these theories to classroom pedagogy and examines the influences of parents, siblings, and peers, as well as aspects of formal and informal education. It also examines the influence of region, culture, class, and gender on language acquisition; legal and ethical issues relative to language competency are addressed.
3 semester hours

EDUCATION 545

English Language and Literature for Teachers.

The purpose of this course is to give prospective teachers of English as a Second Language (ESL) a rich knowledge of literature with potential classroom applications for multicultural settings. Selection and analysis of language processes and literature for elementary and secondary-level classrooms are included.
3 semester hours

EDUCATION 546

Linguistics for Teachers.

This course acquaints teachers with the major analytical frameworks in linguistics. It surveys the discipline of linguistics, the study of human languages, contrastive fea-

tures, and language systems.
3 semester hours

EDUCATION 558

Evaluation of Instructional Outcomes.

This course gives students an orientation to the topics, issues, and concepts in the field of educational testing and measurement. Topics include methods for evaluating instructional programs, types of instruments for collecting data, and a variety of standardized, criterion-referenced, and performance-based assessments. The construction of teacher-made tests and the interpretation of different types of test scores are included.
3 semester hours

EDUCATION 560C

Child Psychology/Learning.

This course examines character formation from the developmental perspective. Learning theory applied to behavior modification is demonstrated.
3 semester hours

EDUCATION 560M

Human Growth and Development, Middle.

This course provides an opportunity for the study of the subject matter of human development, with a concentration upon the uniqueness of the adolescent period. Theoretical models and methods of researching human growth and development including cognition, physical, social, emotional and moral development will be studied. Genetic and environmental influences of human development will be discussed. Implications for classroom instruction in the middle grades will be explored.
3 semester hours

EDUCATION 564

Education of the Exceptional Student.

The focus of this course is placed upon the instructional methods and materials for exceptional students. General management techniques and administrative procedures are considered in light of the student's special needs in order to identify and work effectively with the major categories of exceptional students. General management techniques and administrative procedures are considered in light of the student's special needs in order to identify and work effectively with the major categories of exceptional students, including the learning disabled, the handicapped, and the gifted, etc. Requirements of the 94-142 law are examined.
3 semester hours

Education

EDUCATION 565

Contemporary Problems in Education I.

This is a study of foundations, issues and contemporary trends in education with their application to teaching in the schools. An effort will be made to encourage teachers to develop an understanding of their own philosophy of education and how it affects their teaching.

3 semester hours

EDUCATION 566

Contemporary Problems in Education II.

This independent study fulfills the Final Degree Option for the Master's degree. Students pursue an individually planned project under advisement of a faculty member. Extensive reading supports the project. May be taken as an extension of ED 500 or ED 565.

3-6 semester hours

EDUCATION 571

Diagnosis and Intervention of Reading and Language Arts Difficulties.

This course examines the range of problems that cause students difficulties in literacy processes. It examines assessment instruments and strategies for intervention and instruction in Reading and Language Arts.

3 semester hours

EDUCATION 572

Advanced Diagnosis of Reading and Language Arts Difficulties.

This course is for students interested in working with learners experiencing profound difficulty in reading, writing, and other literacy processes. Students learn strategies for assessing students referred for specific literacy instruction. Both individual and group diagnostic assessments are used. Students learn how to interpret testing results and make recommendations for improvement. Prerequisite: EDUC 571

2 Semester hours

EDUCATION 574

Developmental Reading in the Elementary School.

This course focuses on the theories, instructional applications, and materials for the teaching, learning, and assessment of literacy processes in elementary classrooms. Topics include strategies in word

recognition, vocabulary development, and comprehension. The developmental needs of beginning readers are emphasized.

3 semester hours

EDUCATION 575

Reading and Writing in the Content Areas.

This course focuses on the teaching and learning of comprehension and composing processes and strategies for content area disciplines. Critical reading and study strategies for expository text materials are emphasized.

3 semester hours

ED 575M concentrates on appropriate materials, strategies, and assessments for reading and writing in middle grade settings, 4-8.

3 semester hours

ED 575J concentrates on the comprehension and composing processes of students in secondary-level settings, grades 7-12.

3 semester hours

EDUCATION 580C

Special Problems in Elementary Education.

This is intended for students interested in independent study or research of a selected topic or problem in consultation with a faculty member. By arrangement. Faculty permission required.

1-6 semester hours

EDUCATION 580J

Special Problems in Secondary Education.

This is intended for students interested in independent study or research of a selected topic or problem in consulting with a faculty member. By arrangement. Faculty permission required.

1-6 semester hours

EDUCATION 580L

Special Problems in Behavioral Science Research and Computer Applications.

This course is designed to enhance the efficiency and scope of one's research through the development of specific competencies needed for computer processing. Students will be exposed to computer-assisted instruction (C.A.I.) and computer managed instruction (C.M.I.), and will develop projects that focus on computer applications. By arrangement. Lab fee required.

1-6 semester hours

EDUCATION 590

Computer Literacy.

This is designed to provide the student with hands-on experience in the use and application. The student will have the opportunity to evaluate existing course work and its application as well as the writing of elementary programs in Logo and Basic. Lab fee required.

1-3 semester hours

EDUCATION 591

Software Evaluation.

This is designed to have students develop software evaluation criteria for the purpose of evaluating published computer programs. The student will have an opportunity to review educational programs.

1-3 semester hours

EDUCATION 595

Thesis Research — Masters Level.

This is a culminating experience option at the Master's level for Education students.

2-6 semester hours

EDUCATION 597

Practicum for Reading and Language Arts.

Students complete a case study as a result of providing individual or small group instruction using a variety of assessments and intervention strategies and techniques in a planned, ongoing program for a student or small group of students identified with instructional needs in reading and language arts.

6 semester hours

EDUCATION 600

Statistics and Research Design.

A thorough study of advanced statistical procedures and experimental designs used in education, and of the major methods of non-experimental education research.

3 semester hours

EDUCATION 669

Specialized Professional Study, Project Execution, Part II.

Seminar and project implementation. Prerequisite: Education 668. By arrangement.

1-6 semester hours

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EDUCATION 680C

Advanced Seminar in Elementary Education.

By arrangement. Division permission is required.

1-6 semester hours

EDUCATION 680J

Advanced Seminar in Secondary Education.

By arrangement. Division permission is required.

1-6 semester hours

EDUCATION 695

Advanced Thesis Research — Sixth Year Level.

A culminating experience at the level of the Sixth Year Professional diploma.

2-6 semester hours

Educational Leadership

EDUCATIONAL LEADERSHIP 551

Curriculum Development and Implementation.

This is a study and development of models for curriculum design and implementation at all levels of schooling. Emphasis is placed on current research and practice relevant to curriculum design and the planning and monitoring of curriculum plans in educational settings. Such topics as: curriculum assumptions, goals and objectives, knowledge and content, curriculum evaluation, implementation and staff development strategies are examined.

3 semester hours

EDUCATIONAL LEADERSHIP 601

Contemporary Educational Problems.

This course will focus upon contemporary society and changing policy issues that confront managers and leaders of educational thought throughout the 21st Century. Seminal issues such as the impact of political forces upon federal, state, and local educational policies will be considered. Labor relations will be analyzed. Empowerment of teachers will be examined.

3 semester hours

EDUCATIONAL LEADERSHIP 611

Administration: Organizing and Staffing Educational Institutions.

This introduces administrative and organizational theory. The general theory of decision making. Basic concepts of the essential skills and behaviors of the administrator.

3 semester hours

EDUCATIONAL LEADERSHIP 611A

Organization, Administration, and Supervision of Reading and Language Arts Programs.

This course focuses on the role of the Reading and Language Arts Consultant as an educational leader in schools and school districts and focuses on issues of organization, administration, and supervision of reading and language arts programs. Note: Students enrolled in this course must also concurrently enroll in EDLD 611 Administration: Organizing, and Staffing Educational Institutions. While EDLD 611 focuses on the broader issues of educational leadership in schools, EDLD 611A specifically focuses on reading and language arts programs and personnel.

1 semester hour

EDUCATIONAL LEADERSHIP 612

Planning: Establishing Direction for Educational Institutions.

This is an analysis of the planning component of managing educational institutions. There is a study of application and evaluation of various systems analysis techniques in structuring formal planning systems. The relationship between planning and institutional decision-making is examined. Problems in the implementation of planning activities in educational institutions are discussed.

3 semester hours

EDUCATIONAL LEADERSHIP 613

Leadership: Influencing People to Achieve Organizational Objectives.

This is an investigation of concepts, research findings, and practices focusing on the development and change of educational organizations in relation to relevant goals and objectives. Emphasis is placed on such areas as leadership theory and behavior, organizational climate, human relations and communications within the organization, and change strategies. Theoretical concepts of

leadership are integrated along with practical applications.

3 semester hours

EDUCATIONAL LEADERSHIP 618

Public School Finance.

This is a study of educational fiscal control including: budget preparation and presentation, accounting procedures, tax structures, analyses of costs, comparative data and auditing. Includes federal, state and local phases of support of educational systems. Special emphasis is given to New York and Connecticut fiscal patterns.

3 semester hours

EDUCATIONAL LEADERSHIP 619

Public School Law.

This is a study of the legal basis for public education in the United States; a study of state and federal statutes providing for education. An examination is made of statutes, court decisions, and policies and practices arising out of these factors. The legal status of boards, teachers, administrators, pupils and parents is examined with special emphasis on New York and Connecticut.

3 semester hours

EDUCATIONAL LEADERSHIP 651

Workshop in Curriculum Development.

This is a project-oriented workshop focusing on the practical applications of principles of curriculum design and related instructional systems development. There is an emphasis on the integration of various curriculum considerations in an evaluation of curriculum. This is appropriate for curriculum leaders, supervisors, administrators, and experienced teachers. Prerequisite: Education 551.

3-6 semester hours

EDUCATIONAL LEADERSHIP 652

Supervision: The Evaluation and Professional Development of Educators.

This is a study of concepts and strategies focusing on the evaluation of teachers and other educators for purposes of performance improvement and quality assurance. Emphasis will be placed on research findings, current practices, and the achievement of competency related to classroom observation and evaluation, the planning and implementation of professional development, and the creation of organizational climate and human relationships

Educational Leadership

conduc-cive to effective evaluation and professional growth of educators.
3 semester hours

EDUCATIONAL LEADERSHIP 679

Departmental Seminar in the Management of Educational Institutions.

This is an examination of significant issues, problems and practices in the field of educational management. University faculty members and educational leaders in the field will participate as resource persons. Prerequisites: At least three of the following: Education 611, 612, 613 and 652.
3 semester hours

EDUCATIONAL LEADERSHIP 680A

Independent Study in Educational Management.

Offered by arrangement.
1-6 semester hours

EDUCATIONAL LEADERSHIP 681A

Internship in Educational Management.

A cooperatively guided administrative experience in a school system. Prerequisite: Completion of major portion of the requirements for the Sixth Year Professional Diploma and permission of major advisor.
3-6 semester hours

EDUCATIONAL LEADERSHIP 682A

Special Topics in the Management of Educational Institutions.

Special department offerings including workshops, conferences, institutes focusing on new developments in the field.
1-6 semester hours

EDUCATIONAL LEADERSHIP 683

Internship for the Reading and Language Arts Consultant.

This course is a cooperatively guided administrative experience in the area of literacy education for those desiring to be certified as Reading and Language Arts Consultants. The internship includes a series of practicum experiences in a variety of school settings and includes research in the area of literacy education. Students gain practical field-based experience through a range of tasks and situations characteristic of the position of the Reading and Language Arts Consultant in school settings.
6 semester hours

EDUCATIONAL LEADERSHIP 800

Continuing Doctoral Seminar.

The seminar meets periodically during the academic year and for two full weeks each summer, for three consecutive summers. It provides opportunities for students to work with scholars and leaders from a variety of disciplines to broaden perspectives on educational leadership and to develop an intellectual style for dealing with educational problems.
6 semester hours per year

EDUCATIONAL LEADERSHIP 801

Educational Program Development.

Emerging trends, concepts and practices in the planning, design, and implementation of education programs intended to meet the individual and group needs of learners in a changing society are reinvestigated. Emphasis is placed on the roles and responsibilities of leaders in such processes as school/community educational goal setting, needs analysis, systematic program design, supervision and staff development. Students will focus on the application of new knowledge to the investigation and solution of program development in the field.
6 semester hours

EDUCATIONAL LEADERSHIP 802

Community Analysis and Administrative Decisions.

Ethnic, social class, religious, economic and political factors influencing educational choices and school operations in selected communities and districts are analyzed. Concepts and techniques for understanding community attitudes and aspirations towards education are emphasized.
6 semester hours

EDUCATIONAL LEADERSHIP 803

Organizational Analysis and Development.

Organizational analysis and development is intended to provide practicing educational leaders with concepts, attitudes, and skills required to comprehend the nature, status, and problems of existing school systems, sub-systems, and other educational organizations. It focuses on research relevant to organizational behavior, instruments and techniques for organizational analysis, and the development of managerial, clinical and consultative skills required for training and intervention in the

improvement of organizational functioning.
6 semester hours

EDUCATIONAL LEADERSHIP 804

Constitutional, Legal, and Political Issues Confronting Educational Leaders.

Legal questions relating to personnel, students, community, religion, finance, school property, teacher organizations, equality of opportunity and other legal and political issues with which the educational leader must be familiar in order to be effective in decision-making and organizational development are investigated. Emphasis is placed on "landmark" judicial decisions, recent statutory developments, constitutional background. Students will read, analyze, and interpret significant Supreme Court decisions regarding educational matters as well as pertinent lower federal and state court decisions. The principal of "non judicial" remedies will be explored and the appeals process will be examined in detail.
6 semester hours

EDUCATIONAL LEADERSHIP 805

Policy Determination.

Policy development in the conduct and operation of business organizations, educational institutions, government, and community agencies is analyzed. The human institutional forces shaping policy will be considered. Modes of analysis and questions required to determine sound policy decisions will be explored in terms of concrete and immediate problems confronting society.
6 semester hours

EDUCATIONAL LEADERSHIP 806 A & B

Quantitative Analysis and Evaluation Strategies.

This course considers current techniques for designing, implementing and analyzing projects in education and typical models for facilitating decision-making. The elements of personnel and program assessment within the contemporary educational system are included. Strategies focusing upon experiential learning and community contact are featured, and the student will be exposed to collection and analysis of real data and related computer simulation activities. Statistical and evaluative investigations are emphasized which are both fundamental and sufficiently

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sophisticated for advanced decision-making and leadership. This course is required.
6 semester hours

EDUCATIONAL LEADERSHIP 807

Management of Educational Institutions.

Participants in this course will investigate the planning and finance functions relative to the management of educational institutions. The planning component, the relationship between planning and institutional decision-making, and problems of implementing planning activities in educational contexts are considered. Finance is addressed through the treatment of budget preparation and presentation, accounting procedures, tax structures, and the role of local, state, and federal governments in support of educational system.

6 semester hours

EDUCATIONAL LEADERSHIP 808

Human Relations, Communication, and Decision Making

This course will provide educational leaders with the necessary skills and knowledge to maximize the human resources within an institution. It will develop in participants increased personal awareness, greater sensitivity to others, effective communications and appropriate strategies for change and decision making.

6 semester hours

EDUCATIONAL LEADERSHIP 809

International Education.

This course is designed to provide supervisors, administrators, and curriculum specialists at the elementary, secondary, and collegiate levels with a broad-based understanding of the role of educational leaders throughout the world. Consideration will be given to: how educational leaders are selected and function in various countries; how educational policies are developed and implemented by foreign governments; the impact of the United Nations upon world education.

6 semester hours

EDUCATIONAL LEADERSHIP 845

Dissertation Preparation Seminar.

During the third year of the program, students participate in seminars which focus on the selection and development of a dissertation proposal. Students are ordinarily expected to complete the major portion of their work on the dissertation proposal

prior to the conclusion of the formal part of the program. This course is required.

3 semester hours each term (Fall & Spring)

6 semester hours final summer

EDUCATIONAL LEADERSHIP 850

Dissertation Research and Advisement.

Individual research and advisement relative to a student's dissertation topic is the "sine qua non" of this course. Doctoral candidates are required to register for Education Management 850 continuously until their dissertations have received final approval. The dissertation research and advisement fee is \$800.00 per term. Prerequisite: Successful completion of Comprehensive Examination.

0 semester hours

Electrical Engineering

ELECTRICAL ENGINEERING 415

Fiber Optics.

Communication via light waves over fiber optic cables. Analysis of light emission and light detection. Absorption loss. Optical devices, connectors, splices and Local Area Networks (LANs). Prerequisite: Physics 112 or 202 or equivalent.

3 lecture hours; 3 semester hours

ELECTRICAL ENGINEERING 415

Fiber Optics Lab.

Hands-on experience with fiber optic hardware. Fiber properties, sources, detectors, splices, connectors. Design and test fiber optic transmitter and receiver circuits for both analog and digital transmission. Prerequisites Electrical Engineering 415

3 semester hours

ELECTRICAL ENGINEERING 437

Microwaves.

Passive and active elements for the generation, modulation, amplification and reception of microwaves. Radar and other microwave systems. Prerequisite: Field Theory

3 lecture hours; 3 semester hours

ELECTRICAL ENGINEERING 441

Communications I.

Spectral analysis; modulation and demodulation system analysis, including AM, FM, pulse modulation and transmission of digi-

tal information. Signal design and system considerations. Prerequisite: Electrical Engineering 234.

3 semester hours

ELECTRICAL ENGINEERING 442

Communications II.

Detection of signals in thermal noise. Digital sequences. Optimal filtering and statistical decision theory. Optimum receiver design criteria. Performance, configuration and trade-offs. Prerequisite: Electrical Engineering 441.

3 lecture hours; 3 semester hours

ELECTRICAL ENGINEERING 443

Applied Digital Signal Processing.

The FFT Spectral Analysis, Filtering in the presence of noise. Correlation. Introduction to stochastic signal processing. Computer projects. Prerequisite: Electrical Engineering 360.

3 lecture hours; 3 semester hours

ELECTRICAL ENGINEERING 444

Power Electronics.

Application of power diodes and power transistors in rectifier arrangements and voltage regulators. Properties and application in power converters, inverters and motor drives. Prerequisite: Electrical Engineering 348.

3 lecture hours; 3 semester hours

ELECTRICAL ENGINEERING 445

DC Motor Drives.

The application of power diodes and power transistors in motor starters, and motor speed & torque control. Basic terminal properties of series, shunt and permanent magnet DC motors. Rectifiers and DC up/down converters. The role of the thyristor. Motor dynamic & regenerative braking. Configurations, and efficiency parameter trade offs. Prerequisite: Electrical Engineering 444.

3 lecture hours; 3 semester hours

ELECTRICAL ENGINEERING 447

Semiconductors.

Crysal fabrication: MBE, MOCVD, LEC, Bridgmann. Study material and electronic properties of single crystal Si, poly, a-Si, GaAs, GaN, SiC, Ge, and II-VI compounds. Transport properties: Hall, Peltier, resistivity, mobility. Analysis of capacitance and I/V data for pn, pin, schottky, and heterojunc-

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tion devices. Prerequisite: Mathematics 110.
3 lecture hours; 3 semester hours

ELECTRICAL ENGINEERING 450

Communication Systems Laboratory.

Hands-on experience with digital and analog communication equipment, AM, FM and digital modulation techniques. Design and test of optimal configurations. Measurement of performance parameters in the presence of thermal noise. Prerequisite: Electrical Engineering 441.
3 semester hours

ELECTRICAL ENGINEERING 455

Microwave Laboratory.

Hands-on experience with basic microwave coaxial and waveguide components in various circuit configurations. Measurement of power, wavelength, VSWR, attenuation, directional coupling, impedance. Use of the Smith Chart. Prerequisite: Electrical Engineering 437.
3 lab hours; 3 semester hours

ELECTRICAL ENGINEERING 482

Analog/Digital Integrated Circuit Design.

Do a complete analysis of the 741 op-amp, including bandwidth, gain analysis, slew rate, power efficiency, and I/O impedances. Analyze ROM, RAM, TTL, ECL, CMOS, and more modern logic structures including Fanout, noise margin, latching, contention, logic and delay response. Prerequisite: Electrical Engineering 348.
3 lab hours; 3 semester hours

ELECTRICAL ENGINEERING 500

Graduate Co-op in Electrical Engineering.

By arrangement.
1 semester hour

ELECTRICAL ENGINEERING 545

Advanced Controls Theory.

Root locus analysis and state variable analysis methods applied to continuous systems. Discrete (sampled) systems, z-transform methods and digital controls. Performance and stability criteria. Prerequisite: Electrical Engineering 360.
3 lecture hours; 3 semester hours

ELECTRICAL ENGINEERING 580

Information Theory and Coding.

Introduction to the concepts of amount of information, entropy, and rate of information transmission. C Shannon's theory of

the ideal channel, channel capacity with BW vs S/N trade offs. Orthogonal signal transmission, source and channel coding. Block codes, convolutional codes and the concept of an optimum modulation system. Prerequisite: Electrical Engineering 441.
3 lecture hours; 3 semester hours

SPECIAL STUDIES AND RESEARCH

ELECTRICAL ENGINEERING 597

Advanced Problems in Electrical Engineering.
Lecture hours; semester hours and topics to be arranged. 1-3 semester hours

ELECTRICAL ENGINEERING 598

Thesis in Electrical Engineering.
Lecture hours, semester hours and topics to be arranged. 1-6 semester hours

ELECTRICAL ENGINEERING 599

Independent Study in Electrical Engineering.

Independent study of advanced topics in Electrical Engineering and submission of project report as required. Problem assignment and semester hours to be arranged with and approved by the Department Chair. 1-3 semester hours

Graduate Studies in Business

GRADUATE STUDIES IN BUSINESS 400

Accounting Concepts.

Introduction to principles of financial and managerial accounting including the measurement, processing, and communication of accounting information for use by a variety of users including business owners, managers, creditors, prospective investors, and others interested in the financial condition of an entity and the results of its operations. Prerequisite: Admission to graduate study.
3 semester hours

GRADUATE STUDIES IN BUSINESS 410

Economic Analysis.

The prevailing patterns of economic institutions, national income analysis, international trade, prices and production;

economic development, market structure and consumer decision analysis. Prerequisite: Admission to graduate study.
3 semester hours

GRADUATE STUDIES IN BUSINESS 420

Financial Management.

An introduction to the problems of financing the business firm, in both the short and long runs. Special emphasis on the environment in which financial decisions are to be made, especially with respect to money and capital markets and the financial intermediaries who service these markets, both nationally and internationally. Prerequisite: Admission to graduate study.
3 semester hours

GRADUATE STUDIES IN BUSINESS 430

Organizational Behavior.

This course permits students to examine theory and practice of interpersonal, group process and organizational behavior. Individual and small group projects develop and illustrate principles of relationships, communications, role assignment, leadership and conflict management in organizations. Experiential designs permit learning through group participation, case analysis and individual problem solving. Prerequisite: Admission to graduate study.
3 semester hours

GRADUATE STUDIES IN BUSINESS 431

Operations Management.

The student is introduced to operations management methods and processes which are fundamental to delivery of products and services of every variety. Topics covered include capacity analysis and planning, inventory management, design of jobs for quality and cost effectiveness, demand forecasting, work flow management, project management and total quality management. Prerequisite: Admission to graduate study.
3 semester hours

GRADUATE STUDIES IN BUSINESS 440

Marketing Concepts.

The theoretical underpinnings of the marketing discipline will be taught through text, articles and class discussion. Mastery of these principles will come through a variety of individual and group assignments to create marketing solutions for real-world products. Prerequisite: Admission to graduate study.
3 semester hours

Graduate Studies in Business

GRADUATE STUDIES IN BUSINESS 441

Beginning Textiles.

This course covers the basic concepts of fibers, yarns and methods of fabric construction. Special laboratory assignments are devoted to identification and testing of various natural and synthetic fibers. Prerequisite: Admission to graduate study and approval of faculty advisor.

3 semester hours

GRADUATE STUDIES IN BUSINESS 451

Management Information Systems.

Information system goals, development, and utilization. This course develops the fundamental knowledge, philosophy, and skills necessary for specification, development and utilization of computer-based information systems. Prerequisite: Admission to graduate study.

3 semester hours

GRADUATE STUDIES IN BUSINESS 452

Statistical Decision Theory.

Introduction to basic statistical methodology and its applications to business decision-making. Main topics include probabilities, discrete and continuous probability distributions, probability sampling techniques, sampling distributions, interval estimation and hypothesis testing. Students are encouraged to use statistical software packages to perform statistical analysis. Prerequisite: Admission to graduate study.

3 semester hours

GRADUATE STUDIES IN BUSINESS 500

Accounting for Managers.

The use of accounting information in profit planning and control including accounting systems, budgeting and performance evaluation, and identification and interpretation of relevant data for short-run decision analysis. The objective is to emphasize how accounting information is a valuable part of the over-all management function. Prerequisite: Graduate Studies in Business 400.

3 semester hours

GRADUATE STUDIES IN BUSINESS 502

International Accounting.

Examines the diverse accounting practices employed by different countries and their effects on multi-national firms' operation. Performance evaluation in multi-national enterprises, impact of differences in national accounting principles and practices,

and accounting under central planning. Discussion of critical problem areas such as taxation, transfer pricing, financial planning, and information systems within an international framework. Prerequisite: Graduate Studies in Business 400.

3 semester hours

GRADUATE STUDIES IN BUSINESS 505

Fundamentals of Taxation.

An overview of the major types of taxes used by governments to raise revenue. Emphasis on the taxation of individuals and corporations and tax planning considerations for the individual and for the business manager. Prerequisite: Graduate Studies in Business 400 or equivalent.

3 semester hours

GRADUATE STUDIES IN BUSINESS 506

Advanced Financial Accounting.

An overview of selected accounting topics of interest to international business students. Topics include current practice in accounting for business mergers or acquisitions, accounting for stock investments in affiliated companies, an introduction to consolidated financial statements, accounting for branch operations and an introduction to accounting for state and local governmental units. Prerequisite: Graduate Studies in Business 400 or equivalent.

3 semester hours

GRADUATE STUDIES IN BUSINESS 508

Financial Reporting and Analysis

An overview of generally accepted accounting principles underlying the content of financial statements including alternative inventory valuation methods, lease accounting, segment reporting and reporting for employee benefit plans. Study and analysis of actual corporate annual reports and government and not-for-profit financial statements. Prerequisite: Graduate Studies in Business 400.

3 semester hours

GRADUATE STUDIES IN BUSINESS 510

Managerial Economics.

The role of economics in management decision-making. Applied price theory with case analysis. Prerequisite: Graduate Studies in Business 410 or equivalent.

3 semester hours

GRADUATE STUDIES IN BUSINESS 511

International Trade and Finance.

International trade and finance in the world economy. Topics include spot and forward exchange markets, balance of payments analysis under fixed as well as flexible exchange rates, and the role of the multinational environment. Prerequisite: Graduate Studies in Business 410 and 420 or equivalents; some knowledge of statistics is helpful, but not essential.

3 semester hours

GRADUATE STUDIES IN BUSINESS 520

Advanced Financial Management and Policy.

Maximization of the value of the firm through optimal sourcing and use of funds. Decisions are analyzed using sources and uses of funds, capital budgeting, portfolio theory and the capital asset pricing model frameworks. Prerequisite: Graduate Studies in Business 420 or equivalent.

3 semester hours

GRADUATE STUDIES IN BUSINESS 521

Financial Management of Financial Institutions.

Asset and liability management of financial institutions. Risk, return, liquidity capital adequacy and other relevant issues are discussed and analyzed. Prerequisite: Graduate Studies in Business 420.

3 semester hours

GRADUATE STUDIES IN BUSINESS 522

Investment Analysis.

Provides a framework for the analysis of individual securities including stocks and bonds and other financial instruments. Develops a systematic framework for the construction of efficient portfolios and the evaluation of portfolio performance. Prerequisite: Graduate Studies in Business 420.

3 semester hours

GRADUATE STUDIES IN BUSINESS 523

Financial Futures, Options, and Swaps.

Analysis of the recent financial derivatives like futures, options and swaps. Concepts and application of Hedging, Arbitrage, Duration Immunization, Portfolio Insurance will be given. Also this course will utilize the computer program to be used by many financial managers and arbitragers. Prerequisites: Graduate Studies in Business 420.

3 semester hours

Graduate Studies in Business

GRADUATE STUDIES IN BUSINESS 524

International Financial Management.

Theory and description of foreign exchange rates and foreign exchange markets. Emphasis on external funding sources, financial risk management, foreign exchange risk analysis, international investments, and international banking. Prerequisites: Graduate Studies in Business 420.

3 semester hours

GRADUATE STUDIES IN BUSINESS 528

Technical Analysis & Trading.

This is a hands-on course that teaches principles and methods of selecting and managing stocks using professional trading software. Theoretical concepts and trading principles will be taught throughout the course and students will manage a portfolio in real-time with imaginary funds. Prerequisite: Graduate Studies in Business 420.

3 semester hours

GRADUATE STUDIES IN BUSINESS 530

Management Theory.

Concepts, methods and research which are applicable and useful in the management of organizations are broadly surveyed to increase student's awareness of the breadth and complexity of management processes. Fundamentals of business strategy, organizational structuring, leading, communicating and controlling are examined within contexts of the historical evolution of management thought, concern for high business ethics, and meeting global competition. Prerequisite: Graduate Studies in Business 430.

3 semester hours

GRADUATE STUDIES IN BUSINESS 531

Management Business and Entrepreneurship.

A comprehensive review of the marketing, operating configuration, financial and business strategy plans that must be mastered and developed as foundation for start-up of a small business or entrepreneurial enterprise. Students are required to develop a comprehensive professional business plan for a business of their choice which is acceptable to the instructor. Prerequisites: Completion of all core courses.

3 semester hours

GRADUATE STUDIES IN BUSINESS 532

Advanced Operations Management.

Students in this course apply the methods

from GSB 431 (Management 430) to projects of their own design and choosing, employing PC software designed for application to operations management issues. Emphasis is put on quantitative and data-based problem-solving and decision-making processes applied by the professional manager to the improvement of product or service cost and quality. Prerequisite: Graduate Studies in Business 431 and 452.

3 semester hours

GRADUATE STUDIES IN BUSINESS 533

Human Resources Management.

An in-depth survey is offered of current theory, research and practice in the management of human resources in organizations. Job design, recruitment, selection, performance feedback, goal-setting, training, employee rights, safety, compensation and benefits issues are reviewed within the context of their application in the United States as a world standard for such practices, with comparisons to customs and practices in the international arena. Intensive library research into current human resource research is required. Prerequisite: Graduate Studies in Business 430.

3 semester hours

GRADUATE STUDIES IN BUSINESS 534

Organizational Development.

The theory and practice of organization intervention technology applied as a means to constructive organization change is introduced. Types and levels of intervention are evaluated. Sources of resistance to organizational change are examined and methods for overcoming that resistance are studied. Students apply theory and technology experientially to intervention projects with groups or organizations they currently have access to and evaluate the effectiveness of the approaches used. Prerequisites: Graduate Studies in Business 430.

3 semester hours

GRADUATE STUDIES IN BUSINESS 536

Conflict & Negotiation.

The development of conflict-management and negotiating skills are taught in this course with particular emphasis on achieving effective and efficient outcomes within a global and multicultural context. Experiential exercises, readings and discussions will demonstrate various strategies for a broad range of negotiating scenarios, e.g., buyer-seller, management-labor, personal salary increase, etc.

Prerequisite: Graduate Studies in Business 430.

3 semester hours

GRADUATE STUDIES IN BUSINESS 540

Buyer Analysis.

This course will take up special topics in buyer behavior. The leading models of buyer behavior in both industrial and consumer settings will be analyzed. The qualitative and quantitative marketing research tools necessary to understand buyer behavior dynamics in any market will be stressed. Cases will be drawn from market situations around the world. Prerequisite: Graduate Studies in Business 440.

3 semester hours

GRADUATE STUDIES IN BUSINESS 541

Global Market Management.

Strategy planning, implementation and control for market entry and development. Topics include social, political and economic changes affecting marketing opportunity; focused versus dispersed marketing efforts; marketing in developed and undeveloped countries; and marketing systems required for the various strategic alternatives. Prerequisite: Graduate Studies in Business 440 or equivalent.

3 semester hours

GRADUATE STUDIES IN BUSINESS 542

Mass Merchandising & Retailing.

An analytical study of national and multinational mass merchandising and retailing concepts, including history, concepts, operations, technology and profitability. In-store, non-store, on-air and on-line merchandising and retailing are compared and contrasted. To help learn mass marketing students use virtual merchandising and CAD/CAM software to prepare various types of presentations. Prerequisite: Graduate Studies in Business 441 and approval of faculty advisor.

3 semester hours

GRADUATE STUDIES IN BUSINESS 543

Problems in Marketing Research.

Approaches to sampling, designing survey instruments, developing the right statistical design for analysis of data and analyzing resultant data both quantitatively and qualitatively are explored in this course. Effective methods for organization and reporting of research results are studied and put to practice by the student. Practi-

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cally effective research methodology is emphasized. Prerequisite: Completion of all Core courses.

3 semester hours

GRADUATE STUDIES IN BUSINESS 544

Fashion & Retail Buying.

Course contains buyer theory and analysis demand and inventory/stock control procedures. Computerized spreadsheets are used to plan, analyze and adjust retail activities by revision in quantities and merchandise assortments. Students develop skills in purchasing by using a variety of imaginary domestic and international resources, including the development of private label products. Prerequisite: Graduate Studies in Business 441 and approval of faculty advisor.

3 semester hours

GRADUATE STUDIES IN BUSINESS 545

Advanced Textiles & Product Development.

This course begins with the history of textiles. The student is then introduced to product development to perform merchandising activities for manufacturers, contractors and retailers. Students learn how use PDM software, a standard for the industry, and CAD/Micrografx software to create silhouettes, color and fabrics, and to manipulate images that interface with PDM. Prerequisite: Graduate Studies in Business 441 and approval of faculty advisor.

3 semester hours

GRADUATE STUDIES IN BUSINESS 548X

Internet Marketing.

This course examines the nature of marketing in the evolving industry of Internet businesses, and the Internet's impact on the strategy of traditional "brick-and-mortar" companies. Various business and marketing models will be analyzed and evaluated. This course requires extensive Internet research for student projects. Prerequisite: Graduate School of Business 440.

3 semester hours

GRADUATE STUDIES IN BUSINESS 551

Business Simulation.

Study of the formulation and simulation of business models to enhance the decision-making process. Topics include scope, nature and types of simulation models and languages. Emphasis is on basic concepts, techniques in modeling, interpretation, validation, and optimization. Computer simu-

lation and queuing models will be developed and evaluated. Prerequisites: Completion of all Core courses, advanced Excel skills and comfort in applying statistical techniques. Instructor may test students for acceptable knowledge during the first class.

3 semester hours

GRADUATE STUDIES IN BUSINESS 552

Internet Applications and Opportunities.

The focus of this course is to acquaint the student with the structure of electronic commerce through various technologies. Subjects include e-commerce vs. e-business, design vs. technology, e-business architecture, effect web-site design and maintenance, HTML, XML, CRM, ERP, standards, security, information search and retrieval, and data warehousing. Course format includes discussion and case analysis, and both individual and small group projects. Prerequisites: Graduate Studies in Business 451. Instructor may test students for acceptable knowledge during the first class.

3 semester hours

GRADUATE STUDIES IN BUSINESS 554

Information Systems Analysis and Design.

A course in the analysis, design, and project management of computer-based business systems. Using such tools as system flow charts and decision tables, the course stresses the usability of the system to operating managers. Nontechnical managers are encouraged to participate in the specification, decision-making, and review of system-designs. Documentation, program specifications, system improvement. Course level and content is suitable for managerial as well as the more technically oriented. Prerequisites: Graduate Studies in Business 451 and 555. Instructor may test students for acceptable knowledge during the first class.

3 semester hours

GRADUATE STUDIES IN BUSINESS 555

Database.

This course is an introduction to database concepts, principles, and practices. Emphasis on the object-oriented logical design of relational databases. Hands-on practices in SQL is gained through use of XDB-SQL. Students are required to do a term project. Prerequisites: Graduate Studies in Business 451.

3 semester hours

GRADUATE STUDIES IN BUSINESS 556

Expert Systems.

A nontechnical introduction to expert systems (a branch of artificial intelligence) for managerial decisions. Using state-of-the-art expert systems development software, student project involves developing and demonstrating a rule-based expert system. Topics include: overview of artificial intelligence, expert systems in general and in particular for managerial decisions; rule and reasoning; inference engines, forward and backward chaining; uncertainty, certainty factors, and fuzzy variables; other knowledge representation approaches, semantic nets, frames. Prerequisites: Graduate Studies in Business 451. Instructor may test students for acceptable knowledge during the first class.

3 semester hours

GRADUATE STUDIES IN BUSINESS 557

Networks & Telecommunications.

This course covers the fundamentals of networking, stressing the managerial implications. The telecommunications revolution with respect to the Internet will be analyzed in its own right. Special attention will be given to the study of ethics and security problems in an interconnected world with seemingly unlimited capabilities and capacities. Prerequisite: Graduate Studies in Business 451.

3 semester hours

GRADUATE STUDIES IN BUSINESS 560

Business and Society.

Topics are designed to give the student an awareness of the legal and ethical issues surrounding specific problems that substantially affect the vast economic, marketing system not only in the United States, but also between the United States and other persons or countries engaged in International Business. Prerequisite: Admission to graduate study.

3 semester hours

GRADUATE STUDIES IN BUSINESS 561

Business Policy.

A capstone course dealing with the development and implementation of business strategy within a framework of ethical decision making. This perspective encompasses financial, technical, marketing, production and human resources considerations. Specifically, it tests the capability of the student to apply all prior learning to

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solve actual strategic management problems. The final examination of this course shall constitute, therefore, an outcome assessment of what the student has learned in the Program. This examination, normally an extensive and comprehensive case study, will be graded by several faculty members representing different and relevant disciplines. Prerequisite: Final semester for completion of M.B.A. Program
3 semester hours

GRADUATE STUDIES IN BUSINESS 570

International Issues.

This course focuses on current international issues that affect business operations at home and abroad. Changing business environments are discussed and analyzed. Students are required to formulate new global business policy and strategies in light of emerging international events. In some cases, students may supplement their study by field trips and on-site analysis. Prerequisite: Graduate Studies in Business 440.
3 semester hours

GRADUATE STUDIES IN BUSINESS 580

Leadership & Organizational Change.

This course focuses on the development of leadership skills important in the effective management of change. Through role-playing exercises, videotapes, diagnostic tools, seminar discussion, selected readings, and a group project students will learn theory and build interpersonal skills necessary for providing leadership in diverse multicultural groups and organizations. Prerequisite: Graduate Studies in Business 430.
3 semester hours

GRADUATE STUDIES IN BUSINESS 581

Business Games.

Students will review major business events and technological changes that have taken place in recent decades. With an emphasis on exploring new business venture opportunities, students will be required to develop a business plan which is consistent with their career objectives. Prerequisite: Final semester for completion of MBA Program or approval by faculty advisor.
3 semester hours

GRADUATE STUDIES IN BUSINESS 582

Internship.

Each student in this course will undertake a project in a real organization under the

supervision of an instructor. The student will prepare an industry bibliography and write a paper summarizing the tasks and accomplishments encountered within the organization. Through this experience students will apply management principles and theory in a practical setting. Prerequisite: Approval of faculty advisor.
3 semester hours

GRADUATE STUDIES IN BUSINESS 595

Independent Study in Business.

This course is reserved for a special project that cannot be done any other way and to help a student complete the MBA when no other alternative is available. Prerequisite: Written approval to register by the Director and the Department Chair.
3 semester hours

GRADUATE STUDIES IN BUSINESS 599

Thesis Project.

Completion of a report based on field, library and institutional research to demonstrate ability to conduct investigations in a managerial discipline and simulation techniques. Prerequisite: Final semester of graduate study and approval of faculty advisor.
3 semester hours

Mathematics

MATHEMATICS 401

Advanced Analysis for Scientists and Engineers I.

Partial differential equations, Bessel functions, Legendre polynomials. Fourier series, boundary and initial value problems, topics in vector analysis, tensor analysis. Prerequisite: Math 301 (Differential Equations). One semester of advanced calculus strongly recommended.
3 semester hours

MATHEMATICS 402

Advanced Analysis for Scientists and Engineers II.

Functions of a complex variable, conformal mapping, calculus of residues, operators. Prerequisite: Math 301 (Differential Equations). One semester of advanced calculus, or permission of the instructor.
3 semester hours

MATHEMATICS 403

Functions of a Complex Variable I.

The general theory of functions of a complex variable. Complex algebra, analytic functions and their mappings, complex integration, infinite series, Taylor and Laurent expansion, isolated singularities, residue theory. Prerequisite: One year of advanced calculus.
3 semester hours

MATHEMATICS 404

Functions of a Complex Variable II.

Continuation of Mathematics 403. Additional topics include insofar as time permits, harmonic functions, conformal mapping and applications, normal families. Riemann mapping theorem, analytic continuation, Riemann surfaces, infinite products, entire functions. Prerequisite: Math 403.
3 semester hours

MATHEMATICS 407

Introduction to Modern Analysis.

Metric Spaces, sequences and series, continuity differentiation, Riemann-Stieltjes integral, functions of several variables.
3 semester hours

MATHEMATICS 411 & 412

Introduction to Applied Mathematics 1 & 2.

Introduction to Hilbert Space, Fourier Series, calculus of variations, boundary value problems, Green's functions and integral equations.
3 semester hours

MATHEMATICS 414

Numerical Analysis.

Interpolation, numerical differentiation and integration, numerical solution of differential equations, least squares, error analysis. Prerequisite: Math 215 (Calculus and Analytic Geometry III) or equivalent. Math 301 (Differential Equations) strongly recommended.
3 semester hours

MATHEMATICS 415

Advanced Numerical Analysis.

Conveyance, numerical stability, round off error, discretization error arising from the approximation of differential and integral equations.
3 semester hours

Mathematics • Mechanical Engineering

MATHEMATICS 423

Mathematical Statistics I.

Probability theory, discrete and continuous distributions, transformations, moment generating functions, characteristic functions, central limit theorem, sampling distributions. Prerequisite: Math 215 (Calculus and Analytic Geometry III) or equivalent.
3 semester hours

MATHEMATICS 424

Mathematical Statistics II.

Continuation of Mathematics 423. Additional topics include estimation, testing of hypothesis, confidence intervals, regression, and analysis of variance. Prerequisite: Math 423 or Math 323.
3 semester hours

MATHEMATICS 431

Introduction to Topology and its Application.

Elements of point set theory; introduction to topological spaces including metric spaces; separation and countability axioms; connectedness; compactness; completeness. Prerequisite: One year of advanced calculus.
3 semester hours; offered as needed

MATHEMATICS 451

Linear Algebra and Matrix Theory I.

Linear vector spaces, bases, dimension, inner product, norm, orthogonality. Linear transformations, matrices, matrix algebra, Hamilton-Cayley Theorem, eigenvalues and eigenvectors, rank. Prerequisite: Math 391 (Modern Algebra) or equivalent.
3 semester hours

MATHEMATICS 453

Modern Algebra I.

Groups, rings, fields, ideals, polynomials. Prerequisite: Math 391 (Modern Algebra) or equivalent.
3 semester hours

MATHEMATICS 454

Modern Algebra II.

Continuation of Math 453. Modules, field extensions, Galois theory, real fields, special topics. Prerequisite: Math 453.
3 semester hours

MATHEMATICS 480

Selected Topics in Mathematics.

Current topics in applied mathematics topics will be selected from specific disciplines as

a focus for intense study. Current topics in Physics, Chemistry, Biology and Computer Science will be offered on a semester basis. The course may be repeated as long as topical focus changes.
3 semester hours

Mechanical Engineering

MECHANICAL ENGINEERING 409

Advanced Thermodynamics.

Thermodynamic systems. Transfer of heat. Reversibility and irreversibility. Entropy. Properties of pure substances. Applications of thermodynamics to special systems. Change of phase. The physics of very low temperatures. Chemical thermodynamics. Ideal gas reactions. Heterogenous systems. The third law of thermodynamics. Equilibrium conditions and stability.
3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 410

Advanced Fluid Dynamics.

Advanced topics in applied fluid mechanics. Review of continuity, momentum, and energy equations for viscous, incompressible fluid; vorticity and circulation concepts and theorems. Selected topics from the following areas: Complex potential, conformal mapping and applications. Airfoil and wing theory. Boundary layer theory; similarity solutions for laminar flows, integral techniques for turbulent flows. Compression and expansion waves in compressible flows; oblique shock waves, Prandtl-Meyer flow. Propagating waves and applications; shock tube, transients in duct systems.
3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 417

Control System Engineering.

Introduction to analysis and synthesis of feedback systems. Dynamic modeling of pneumatic, hydraulic, thermal, electromechanical systems, and manufacturing processes. Concept of transfer functions and block diagram representations. Functional description of linear and non-linear systems. Linearization and dimensionless scaling. State-space representation of dynamic systems. Transient response using convolution integral and computational techniques. Root locus and frequency response methods. Performance indices and error

criteria. Controller realization. Case studies.
3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 421

Computer Aided Engineering Design.

This course applies 3-D CAD system e.g., Pro E to industrial product and system design. These CAD systems are very practical and powerful 3-D CAD tools and they have been widely used in the industry. The first half of the class focuses on learning fundamentals of the 3-D system, its popular applications and its related techniques. The special topics of design concept are also included. The second half covers several practical projects. Students will combine the design techniques with the real project and use 3-D tools to design the product or part of industrial system. All projects will be presented by students in class.
3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 422

Advanced Computer Aided Project Design.

This advanced course focuses on some hot and very practical topics in today's industrial design applications. Also, some useful knowledge, such as PLC (Program Logic Control), calculation and selection of industrial motors, fundamentals of automation, sensor technology, and selection of material on different industrial applications are included. Several more complicated projects in this class will help students learn how to manage the different engineering projects and understand all related design issues which will improve the future production and manufacturing process. Pro-E will be used as a 3-D CAD tool to design these advanced engineering projects. All projects should be presented by students in the class.
3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 423

Computer Aided Manufacturing (CAM) and NC Machining.

This course applies manufacturing and various numerical controlled software for designing computer-aided manufacturing and NC machining systems, processes and algorithms. This course is heavy in implementation of various manufacturing technologies and programming of NC machines.
3 lecture hours; 3 semester hours

Mechanical Engineering

MECHANICAL ENGINEERING 430

Design & Innovation.

The objective of this course is to convey a sense of Design and Innovation in the development of products. To accomplish this the class shall review a number of case studies and participate in the design of a project. In addition to the semester project we shall discuss a number of topics of concern to Design and Engineering through illustrated talks (slides/tapes) and when available with guest designers and engineers.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 440

Ergonomic Factors in Design.

This course introduces the student to the concepts of ergonomics. Ergonomics is the study of fitting the workplace and devises to the capabilities of the human worker. Students will have an understanding of the beginnings and evolution of the field of ergonomics. They will learn to recognize risk factors associated with repetitive stress disorders (e.g., carpal tunnel syndrome) and potential sprain/strain injuries as well as be familiar with the body areas affected. This course covers principles of physiology and biomechanics and how they apply to workstation and tool design.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 450

Structural Mechanics.

Introduction to matrix algebra; Formulation of stiffness and flexibility matrices. Application to indeterminate frames, beams, rings, and arches. Numerical techniques for the solution of isotropic and anisotropic plates. Introduction to the finite element method of analysis. Problems will be computer-oriented.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 451

Advanced Strength Analysis.

Development of advanced stress analysis techniques such as beams on elastic foundation, membranes of revolution, rotating disks, axisymmetric shrink fit, thermal stress, torsion of noncircular members, and introduction to plate-bending theory to help solve design problems. Prerequisites: Mathematics 401 or permission of the instructor.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 452

Advanced Vibrations.

Brief review of systems with one and two degrees of freedom. Rayleigh's method. Application of Lagrangian and matrix methods to discrete systems with many degrees of freedom; normal mode theory; vibrations of finite continua; solution methods and mathematical properties. Numerical and computer methods. Sensitivity analysis. Applications to machines and structures.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 453

Finite Element Methods in Mechanical Engineering.

Formulation of finite element characteristics using energy methods. Convergence criteria. Consistent load and mass matrices. In-plane and axisymmetric analysis using simple and higher-order triangular and quadrilateral elements. Finite element analysis of plate-bending problems. Isoparametric concepts and formulation; applications to two- and three-dimensional stress analysis. Topics from the following areas will be chosen as time allows: buckling and vibration studies using discrete element techniques; finite element applications in fluid flow and heat transfer. Prerequisite: Mechanical Engineering 450 or permission of instructor.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 454

Advanced Dynamics.

Orthogonal coordinate systems and their transformations. Particle kinematics in inertial and noninertial rotating coordinate systems. Dynamics of systems of particles and rigid bodies. Virtual work and generalized coordinates. Lagrange's equations and Hamilton's principle for holonomic and non-holonomic systems with applications. Lagrange multipliers. Prerequisites: Mathematics 301 or equivalents.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 456

Mechanics of Composite Materials.

Introduction to the mechanics of laminated filamentary composites. Prediction of stiffness and strength of laminated plates. Applications. Prerequisites: Mathematics 301 or equivalents.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 458

Fatigue and Fracture Mechanics.

Brittle fracture of structures, elastic stress analysis of cracked components, static and dynamic failures, plane stress and plane strain, elastic-plastic fracture mechanics, fatigue crack growth and life prediction under constant and variable amplitude loading, environmental effects. Term work is mainly design problems and is computer oriented.

*3 lecture hours; 3 semester hours;
1 design semester hour*

MECHANICAL ENGINEERING 463

Advanced Heat Transfer.

Topics in conduction, convection and radiation heat transfer. Numerical methods, phase change, boundary layer principles, gas and solar radiation, combined heat and mass transfer. Prerequisite: Mathematics 401.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 490

Intellectual Property and Technology.

This course is designed for graduate students who have an undergraduate degree in Engineering, Computer Science, Mathematics, Physics, Biology, Industrial Design, etc. Students need not have any familiarity with United States law but they must be prepared to read extensively under the instructor's guidance, statutes and cases decided by the Federal and State courts.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 497

Advanced Problems in Mechanical Engineering.

Lecture hours, semester hours and topics to be arranged.

MECHANICAL ENGINEERING 500

Graduate Co-op in Mechanical Engineering.

By arrangement.

1 semester hour

MECHANICAL ENGINEERING 505

Theory of Plates and Shells.

Mathematical formulations of plate equations from elasticity equations. Plates subjected to lateral loads. Solutions by means of Fourier series and integrals. Introduction to variational calculus and methods by Ritz, Galerkin, and Kantorovich. Nonlinear elasticity equations as applied to the von Karman

Mechanical Engineering • Naturopathic Medicine

equations. Instability and vibration of plates. Membrane and bending theory of shells. Applications related to spherical and cylindrical shells. Prerequisites: Mathematics 401 and Mechanical Engineering 451D or permission of instructor.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 510

Theoretical Fluid Mechanics.

The mathematical treatment of the dynamics of ideal fluids. Continuity and motion equations, stream and potential functions, vorticity, circulation. Methods of singularities, separation of variables, and conformal mapping. Jourkowski and Schwartz Christoffel transformations. Calculation of pressure distributions and forces on bodies and other applications. Prerequisites: Mathematics 401 and Mechanical Engineering 410

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 511

Fixed and Rotary Wing Aircraft Principles.

Fundamentals of aerodynamics and fluid flow concepts for developing fixed wing and rotary wing aircraft performance. Two-dimensional aerodynamic characteristics of airfoils and their application in both airplane and helicopter design. Means for augmenting lift and the effects of various types of high lift devices on the aerodynamic characteristics. Aerodynamics of finite aspect ratio wings leading to the fundamentals of airplane performance calculation. Theory of helicopter hovering and vertical flight including autorotation and the aerodynamic behavior of the rotor and helicopter in forward flight. Introduction to airplane and helicopter stability. Prerequisites: Mechanical Engineering 410 and a course in control theory or permission of instructor.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 513

Gas Turbines I.

Introduction to gas turbine fundamentals with emphasis on thermodynamics, cycle analysis, energy transfer in turbomachinery, component performance and component matching. Discussion of various gas turbine engine types including turboshaft (non-regenerative and regenerative cycles), turbojet, turbofan and turboprop. Aero/thermodynamic behavior of components: compressor, turbine, combustor, diffuser, and nozzle. Background to assess characteristics and performance of various gas

turbine types. Prerequisite: Permission of instructor.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 514

Advanced Gas Dynamics.

Review of one-dimensional gas dynamics. Continuous unsteady one-dimensional flows of perfect fluids. Unsteady flows of perfect fluids involving discontinuities. Spatial supersonic steady flows of perfect fluids. Selected topics in viscous and heat-conducting compressible flows and boundary layers. Prerequisites: Mechanical Engineering 410.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 516

Helicopter Aerodynamics and Performance.

Rotor aerodynamics: blade element theory, momentum theory, Goldstein's theory, modern vortex theories. Comparison of theory and experiment in hover, transition and high speed flight, rotor blade motion: articulated and hingeless Rotors. Helicopter performance estimation in level flight, autorotation and climb; control required to trim in steady flight. Prerequisite: Mechanical Engineering 511.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 516

Turbomachinery.

Design and performance prediction of turbines and compressors including axial and radial turbomachinery stages. Simplified models: axisymmetric flow rotating and stationary passages, free vortex theory, blade element design, loss prediction and cooling. Multistage compressor preliminary design, stacking, instability and surge. Prerequisite: Mechanical Engineering 513.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 517

Gas Turbines II.

An introduction to mechanical design aspects of critical gas turbine elements. Centrifugal, thermal and vibratory stresses in blades and discs; analysis of shaft critical speeds. Design impact of material selection on creep rupture and low cycle fatigue life. Combustor design including sizing, cooling, ignition, stability and pollutant formation. Engine controls: hydromechanical, pneumatic and electronic to provide safe engine operation during transients.

Physical phenomena of turbomachinery and jet noise generation and design criteria to reduce noise emission. Prerequisite: Mechanical Engineering 513.

3 lecture hours; 3 semester hours

MECHANICAL ENGINEERING 519

Master's Project.

1-3 semester hours

MECHANICAL ENGINEERING 519

Thesis in Mechanical Engineering.

Lecture hours, semester hours and topics to be arranged.

1-6 semester hours

MECHANICAL ENGINEERING 519

Independent Study in Mechanical Engineering.

Independent study of advanced topics in Mechanical Engineering and submission of project report as required. Problem assignment and semester hours to be arranged with and approved by the Department Chair.

1-3 semester hours

Naturopathic Medicine

Basic Sciences

BASIC SCIENCES 511

Anatomy I.

This course provides an in depth study of the macroscopic human anatomy and it covers the structure of the trunk and neck regions. Clinical aspects of the vascular and neurological relationships of these regions will be emphasized. Instruction includes lectures and laboratories with the dissection of human cadavers and the study of prosections, bones, models and interactive multimedia software.

4 lecture hours, 3 laboratory hours, 5.5 semester credits

BASIC SCIENCES 512

Histology.

This course is designed to provide the student with an understanding of microscopic human anatomy and its relationship

Naturopathic Medicine

to the cellular, tissue and organ level. A strong emphasis is placed on the association between histological structure and function of the skeletal, muscular and nervous systems.

*3 lecture hours, 2 laboratory hours,
4 semester credits*

BASIC SCIENCES 513

Embryology I.

This course covers the embryological development of the human embryo as a whole, including gametogenesis, fertilization, and structural development from the zygote to birth.

1 lecture hour, 1 semester credit

BASIC SCIENCES 514

Biochemistry.

This course is designed to provide the student with an understanding of the biochemical principles involved in maintaining functional integrity of the body through energetics and the principles involved in nutritional balance.

*3 lecture hours, 2 laboratory hours,
4 semester credits*

BASIC SCIENCES 515

Physiology I.

This course emphasizes the function of cellular structures which regulate homeostasis as well as their role in cell division and genetic control of protein synthesis. Emphasis is placed on the role of the cell membrane in the control of cellular events, particularly the propagation of action potentials and their role in muscle contraction. The effects of physiology on the hormones, their role in homeostasis, and functional changes associated with homeostasis are considered.

*2 lecture hours, 2 laboratory hours,
3 semester credits*

BASIC SCIENCES 521

Anatomy II.

This course is a continuation of Anatomy I and it covers the structure of the head and extremities. Clinical aspects of the neurological and vascular relationships of these regions will be emphasized. Instruction includes lectures and laboratories with the dissection of human cadavers and the study of prosections, bones, models and interactive multimedia software. Prerequisite:

sites: NBS511, NBS512.

*4 lecture hours, 3 laboratory hours,
5.5 semester credits*

BASIC SCIENCES 522

Microbiology.

This course covers a comprehensive overview of structure, function, growth and genetics of microorganisms. Host-parasite relationships of representative bacterial, viral, fungal and parasitic agents of human diseases are examined. An organism approach is used to survey microbial and parasitic diseases, with emphasis of modes of transmission, mechanisms of virulence, symptoms, diagnosis, treatment and prevention of associated diseases. Presentations include lecture, laboratory and case studies.

*4 lecture hours, 2 laboratory hours,
5 semester credits*

BASIC SCIENCES 523

Embryology II

This course is a continuation of Embryology I. It correlates the embryological development with the anatomy offered in Semester II. Prerequisite: BS513

1 lecture hour, 1 semester credit

BASIC SCIENCES 525

Physiology II.

This course is a study of the physiology at the organ and systems level. Included is the study of the circulatory, respiratory, renal, cardiovascular, gastrointestinal, and urogenital systems. Also included is the study of the endocrine system and its interrelationships with various organs and systems. There is an integration of normal physiology with pathophysiology and clinical concepts. Prerequisites: BS512, BS514, BS515.

*4 lecture hours, 2 laboratory hours,
5 semester credits*

BASIC SCIENCES 611

Neuroscience.

This course focuses on the central nervous system with emphasis on the neuroanatomy and neurophysiology of sensory systems in the spinal cord and brain, including mechanisms of pain perception. Organization of cortical and subcortical motor systems including basal ganglia, cerebellum, and the brainstem is covered, with an emphasis on the correlation of anatomical

structure to physiological function. The course finishes with discussion of higher cortical functions and parcellation of function in the cerebral cortex.

2 lecture hours, 2 semester credits

Botanical Medicine

BOTANICAL MEDICINE 531E

Medicinal Plants I.

This course covers basic plant botany and local plant identification, harvesting and drying techniques and preparation of dry and fresh botanical tinctures, salves and other preparations. Emphasis on this course is on learning to identify plants in their native state and developing an appreciation not limited to seeing them as medical agents. Elective.

2 lecture hours, 2 semester credits

BOTANICAL MEDICINE 611

Botanical Medicine I.

This course comprises a detailed survey of plants and plant preparations used in naturopathic practice, integrating traditional herbal knowledge with modern pharmacological research. The pharmacognosy, pharmacodynamics, toxicology, and therapeutics of each plant are considered.

Prerequisites: BS525

3 lecture hours, 3 semester credits

BOTANICAL MEDICINE 621

Botanical Medicine II.

This course is a continuation into the second semester of Botanical Medicine I. Prerequisite: BM611.

3 lecture hours, 3 semester credits

BOTANICAL MEDICINE 631E

Botanical Medicine III.

This course is an introduction to the emerging knowledge of the traditional pharmacopoeia of other cultures. Elective. Prerequisite: BM621.

2 lecture hours, 2 semester credits

BOTANICAL MEDICINE 632E

Botanical Medicine IV.

This course is the study of the advanced Botanical Materia Medica as practiced by the Eclectic School of Medicine through-

Naturopathic Medicine

out most of the twentieth century. It comprises an in depth study of the indications for the clinical use of botanical preparations. Prerequisite BM621. Elective.
2 lecture hours, 2 semester credits

Clinical Nutrition

CLINICAL NUTRITION 522

Nutrition I.

This course provides the foundation for therapeutic nutrition. It explores the biochemistry of the macronutrients as well as the known vitamins and minerals in detail. Toxicities, deficiencies, therapeutic uses and appropriate doses are examined. An assessment of the dietary needs and the application of therapeutic nutrition in treating individual diseases and syndromes is also taught. Prerequisites: BS525, BS514, CS611.
4 lecture hours, 4 semester credits

CLINICAL NUTRITION 621

Nutrition II.

This course focuses on food as medicine. Therapeutic diets, dietary manipulation and supplementation are discussed in detail. Emphasis is on restoring normal physiological function and structural integrity by providing the normal components of living systems. Prerequisite: NT621.
4 lecture hours, 4 semester credits

Clinical Sciences

CLINICAL SCIENCES 511

History Taking/Critical Thinking

An Introduction to clinical studies through interview techniques and overview of critical assessment methods employed in practice
1 lecture hours, 1 semester credits

CLINICAL SCIENCES 521

Diagnosis Skills: Physical Exam.

This lecture and laboratory course introduces students to the procedures necessary to examine the various systems of the body. Normal and abnormal findings are presented and discussed. Students con-

tinue to refine their history taking skills and development of diagnostic reasoning skills.
2 lecture hours, 2 laboratory hours, 3 semester credits

CLINICAL SCIENCES 611

Pathology I.

This course is a study of the pathophysiological process and how this process alters the gross, microscopic, and clinical manifestations of disease. Basic pathological processes of inflammation, repair, degeneration, necrosis, immunology, and neoplasia is presented. Laboratory includes the study of gross and microscopic changes as well as clinical presentations of various diseases and functional disturbances. Prerequisites: BS511, BS512, BS513, BS515.
2 lecture hours, 2 laboratory hours, 3 semester credits

CLINICAL SCIENCES 612

Clinical Diagnosis I.

This course covers the techniques for physical examination of various systems of the body including a developing appreciation for normal variations and abnormalities associated with various disease states. The student is taught to recognize the signs and symptoms of common diseases, laboratory evaluation for further assessment and procedures involved in diagnosing the patients condition. Prerequisites: BS521, BS523, BS525.
5 lecture hours, 5 semester credits

CLINICAL SCIENCES 613

Public Health/Epidemiology.

This course covers the current environmental and public health concerns and issues. The course integrates health with diet, air and water pollutants, noise, and substance abuse, compares community hygiene and industrial hygiene, defines epidemiology, and recognition of major communicable and non-communicable diseases. Prerequisite: BS522.
3 lecture hours, 3 semester credits

CLINICAL SCIENCES 614

Immunology.

This course covers the cellular and humoral components of the immune system and the physiologic role that is played by each in the protection of the host. Hypersensitivities, allergies, immunodeficiencies, autoimmune diseases, and psychoneuro-

immunology are also discussed. Prerequisites: BS525, BS522
2 lecture hours, 2 semester credits

CLINICAL SCIENCES 621

Pathology II.

This course is a continuation of the study of the pathological processes of various diseases. This course emphasizes the pathological basis of systemic diseases of the cardiovascular, respiratory, gastrointestinal, urogenital, endocrine, hepatobiliary, renal and pancreatic systems. The gross, microscopic, and clinical manifestations of various disease processes are presented. Prerequisite: CS611.
4 lecture hours, 2 laboratory hours, 5 semester credits

CLINICAL SCIENCES 622

Clinical Diagnosis II.

This course is a continuation of Clinical Diagnosis I. Prerequisite: CS612.
3 lecture hours

CLINICAL SCIENCES 623

Laboratory Diagnosis I.

This course introduces the student to the appropriate use and interpretation of laboratory tests. Prerequisites: BS514, BS525.
3 lecture hours, 3 semester credits

CLINICAL SCIENCES 711

Diagnostic Imaging I.

The focus of this course is radiographic anatomy, and imaging modalities. A basic introduction to imaging, including radiography, computer tomography (CT), magnetic resonance imaging (MRI), ultrasound, and bone scan (scintigraphy) is discussed. The basic concepts of these modalities, and their use in diagnosis are discussed. This course will also cover basic radiographic anatomy of the skeletal, cardiopulmonary, and gastrointestinal systems. Prerequisite: BS521
2 lecture hours, 2 semester credits

CLINICAL SCIENCES 712

Medical Genetics.

This course covers the basis, the diagnosis, and the transmission of chromosomal and genetic disorders. The role of genetics and disease and the pre-natal diagnosis of genetic and chromosomal abnormalities are emphasized. Prerequisites: BS515, CS611.
1 lecture hour, 1 semester credit

Naturopathic Medicine

CLINICAL SCIENCES 713

Laboratory Diagnosis II.

This course is a continuation of Laboratory Diagnosis I with emphasis on the interpretation of laboratory data in the assessment of disease conditions and the practical application and use of laboratory methods. Prerequisite: CS623.
*2 lecture hours, 2 laboratory hours,
3 semester credits*

CLINICAL SCIENCES 714

Clinical Forum I.

This course explores the clinical applications of the basic sciences and the clinical courses taught concurrently in this semester. Case presentations and clinical skills are emphasized through a problem based learning format using naturopathic principles as the foundation.
2 laboratory hours, 1 semester credit

CLINICAL SCIENCES 721

Pharmacology I.

The general principles of pharmacology are covered. Drug solubility, absorption, movement across membranes, distribution, biotransformation, and elimination will be discussed. Dose response relationships, pharmacodynamics, pharmacogenetics, drug toxicity, signal transduction and second messengers are covered. The pharmacology and toxicology of the drugs of the nervous system will be examined. Prerequisites: BS515.
2 lecture hours, 2 semester credits

CLINICAL SCIENCES 722

Diagnostic Imaging II.

The focus of this course is to discuss the role of diagnostic imaging in pathologic processes. Differential diagnosis, and clinical correlation of these conditions are reviewed. Radiographic findings consistent with, or common to each condition are covered. Appropriateness of advanced imaging, for various conditions is also discussed. Prerequisite CS 711
2 lecture hours, 2 semester credits

CLINICAL SCIENCES 723

Clinical Forum II.

This course is a continuation of Clinical Forum I and explores the clinical applications of the basic and clinical sciences being taught concurrently in this semester.
2 laboratory hours, 1 semester credit

CLINICAL SCIENCES 724

Emergency Procedures.

This course prepares the student for emergency situations, both in and out of the office or hospital. Allopathic treatments along with naturopathic therapies are discussed. PCR certification and familiarity with the AED (defibrillator) are taught. There is an in-hospital emergency department rotation where the student will obtain "hands-on" experience. Procedures including phlebotomy, IV therapy and injections are emphasized.
2 lecture hours, 2 semester credits

CLINICAL SCIENCES 811

Pharmacology II.

This course examines the most common pharmaceutical agents in clinical practice and the ones most likely to be encountered in a clinical setting in general practice. It reviews antibiotics, antimicrobials, both steroidal and non-steroidal, anti-inflammatory, chemotherapeutic agents, hormones, and commonly prescribed medications. Prerequisite: CS721.
2 lecture hour, 2 semester credits

CLINICAL SCIENCES 812

Environmental Medicine.

This course focuses on the effects of pollutants in the home, workplace and elsewhere in the environment. Diagnosis and treatment of health conditions caused by these pollutants is discussed with special emphasis on treating the chemically sensitive patient or those with environmental illness. Prerequisites: CS622
1.5 lecture hours, 1.5 semester credits

Homeopathic Medicine

HOMEOPATHIC MEDICINE 621

Homeopathy I.

This course lays the foundation of the basic laws and principles of Homeopathy upon which future courses will build. The principles as set forth by Hahnemann in his Organon are the bases of the course. The student will also become thoroughly acquainted with the use of Kent's Repertory.
2 lecture hours, 2 semester credits

HOMEOPATHIC MEDICINE 711

Homeopathy II.

This course will continue the examination of Homeopathy, with emphasis on the concept of acute prescribing, case taking, and analysis. Students will continue their discussion and understanding of basic remedies, especially the drug pictures of the major polycrest remedies. Prerequisite HM621
3 lecture hours, 3 semester credits

HOMEOPATHIC MEDICINE 721

Homeopathy III.

Students will continue to understand the hierarchy of symptoms as they are expressed in the repertory and will begin to recognize the keynote symptoms of various remedies and be able to distinguish among them. The differences between constitutional and acute prescribing will be discussed. Prerequisite: HM711.
3 lecture hours, 3 semester credits

Naturopathic Obstetrics

NATUROPATHIC OBSTETRICS 711

Obstetrics I.

This course addresses itself to health care appropriate to the special circumstances of pregnancy. Topics covered include diagnosis of pregnancy, pre-natal care, therapeutics for early pregnancy, management of minor complaints of pregnancy, infertility, an overview of normal labor and birth, and the post-partum care of mothers and infants. Prerequisites: CS622, CS623.
2 lecture hours, 2 semester credits

Naturopathic Practice/ Organ Systems

NATUROPATHIC PRACTICE 711

Gynecology.

The focus of this course is the female genital system and the diagnosis and naturopathic treatment of conditions associated with it. Prerequisite: CS622.
3 lecture hours, 3 semester credits

Naturopathic Medicine

NATUROPATHIC PRACTICE 721

Pediatrics.

This course involves the recognition and diagnosis of the conditions of the pediatric patient encountered in a general naturopathic practice. Naturopathic therapy and management of these disorders are discussed along with the appropriate use of referral. Prerequisites: CS622, CS623. *2 lecture hours, 2 semester credits*

NATUROPATHIC PRACTICE 722

Cardiology.

The pathophysiology, diagnosis and naturopathic treatment of conditions affecting the heart and circulatory system are discussed. Prerequisites: CS622, CS623. *2 lecture hours, 2 semester credits*

NATUROPATHIC PRACTICE 723

Gastroenterology.

This course examines the digestive tract and associated organs, and disorders associated with it. The physical examination, imaging, and laboratory techniques necessary to understand and diagnose these disorders are discussed along with the naturopathic treatment. Prerequisites: CS622, CS623. *2 lecture hours, 2 semester credits*

NATUROPATHIC PRACTICE 724

Minor Surgery.

This course is designed to teach students to diagnose those conditions that are safely treated by office surgery and the principles and practical techniques involved in the performance and follow up of office surgical procedures. Prerequisites: CS622. *1.5 lecture hours, 1 laboratory hour, 1.5 semester credits*

NATUROPATHIC PRACTICE 731E

Advanced Minor Surgery.

This course is designed to give the student more practical experience in minor surgery with various suturing techniques. Elective. Prerequisite: NP724. *1 lecture hour, 2 laboratory hours, 2 semester credits*

NATUROPATHIC PRACTICE 811

Eye, Ear, Nose and Throat.

The primary focus in this course is in the diagnosis and naturopathic treatment of EENT problems. An understanding of potential emergency situations and others

needing referral is developed. Prerequisites: CS622, CS623

1.5 lecture hours, 1.5 semester credits

NATUROPATHIC PRACTICE 812

Endocrinology.

This course focuses on the interaction of the various hormonal systems in the body and the disorders which may arise therefrom. Naturopathic treatment of common hormonal imbalances is discussed. Prerequisites: CS622, CS623.

1.5 lecture hours, 1.5 semester credits

NATUROPATHIC PRACTICE 813

Neurology.

This course constitutes a review of the neurological exam with emphasis of the diagnosis of neurological conditions. The naturopathic treatment and management of diseases of the nervous system are discussed. Prerequisites: CS622, BS611.

1.5 lecture hours, 1.5 semester credits

NATUROPATHIC PRACTICE 821

Geriatrics.

This course covers the aging process and the medical problems of the elderly patient. Diagnosis and therapies unique to this population are discussed. Emphasis is on the management or slowing of degenerative changes. Prerequisites: CS622.

1 lecture hour, 1 semester credit

NATUROPATHIC PRACTICE 822

Urology/Proctology.

This course covers the diagnosis and naturopathic treatment of disorders of the urinary system and the anal rectal region. The treatments of cystitis, urethritis, various forms of nephritis, urinary tract stones and an examination and treatment of the male genital system is included in the urology section. The treatment of internal and external hemorrhoids, proctitis and other anal/rectal conditions is covered in the proctology section. Prerequisites: CS622, CS623.

1.5 lecture hours, 1.5 semester credits

NATUROPATHIC PRACTICE 823

Oncology.

This course covers the diagnostic, prognostic and preventative and epidemiological information for common cancers. Various theories of cancer are discussed as well as both conventional and non-con-

ventional treatments. Prerequisites: CS622, CS623.

1.5 lecture hours, 1.5 semester credits

NATUROPATHIC PRACTICE 824

Dermatology.

The diagnosis and treatment of diseases which manifest in skin lesions are discussed. Naturopathic treatment and prevention are taught. Prerequisites: CS622, CS623.

1.5 lecture hours, 1.5 semester credits

Naturopathic Principles and Practice

PRINCIPLES AND PRACTICE 511

Naturopathic History and Philosophy.

This course is a survey and introduction to the history & philosophy of Naturopathic Medicine as a distinct healing art as well as its fundamental roots: Botanical Medicine, Nature Cure, Physical medicine, Hydrotherapy, Homeopathy, Energy Medicine, and Ancient Healing systems from around the globe. We will also explore the politics of medicine, women and healing, psychoneuroimmunology, the philosophy of vitalism and mechanism, shamanic and entheogenic healing and encourage students to "live their philosophy" incorporating the precepts of Naturopathic medicine into their lifestyles.

2 lecture hours, 2 semester credits

PRINCIPLES AND PRACTICE 519E

Fundamentals of Ayurvedic Medicine.

This course covers the basic concepts of Ayurvedic Medicine, the natural science of body-mind healing. Ayurvedic body-type, balanced and unbalanced state, Ayurvedic life-style, Ayurvedic cleansing (panchakarma) customizing the health plan to suit the unique body constitution and commonly used Ayurvedic herbs.

2 lecture hours, 2 semester credits

PRINCIPLES AND PRACTICE 521

Naturopathic Philosophy and Therapeutics.

This is a continuation of Naturopathic History and Philosophy. The philosophical principles of empirical medicine with an emphasis on vitalism are discussed in

Naturopathic Medicine

detail with appropriate therapeutic examples. Prerequisite: PP511.

2 lecture hours, 2 semester credits

PRINCIPLES AND PRACTICE 811

Practice Management I.

Students are taught the current procedural practices for the operation of a private practice. In addition, the practical aspects of operating a practice as a small business are discussed. Students are encouraged to begin thinking about their personal career path in naturopathic medicine. Prerequisites: CS611, CS622.

2 lecture hours, 2 semester credits

PRINCIPLES AND PRACTICE 821

Medical Jurisprudence and Ethics.

This course covers the basics of law as it applies to medical practice. Informed consent, confidentiality and professional liability are discussed in detail. Naturopathic licensing laws in various jurisdictions are contrasted and compared along with an in depth review of the practice act in Connecticut. Prerequisite: PS712.

1.5 lecture hours, 1.5 semester credits

PRINCIPLES AND PRACTICE 822

Practice Management II.

This course introduces the student to the business procedures and practice used in the successful operating of a business. Prerequisite: PP721.

1.5 lecture hours, 1.5 semester credits

Oriental Medicine

ORIENTAL MEDICINE 611

Oriental Medicine I: Fundamentals.

This course introduces the fundamental philosophy, diagnostic techniques and therapeutic techniques of Oriental medicine and Traditional Chinese Medicine ("TCM"). The purpose of the course is to allow the student to integrate the basic philosophical concepts of Oriental Medicine into naturopathic practice. This includes applying TCM principles and Oriental medical philosophy to the human body; having a basic appreciation for relationships between the Oriental zangfu ("organs"); and having a fundamental understanding of the Oriental modes of diagno-

sis, as found in the "Four Examinations" and "Eight Principles" including pulse, tongue, facial, palpation, and questioning techniques. The basic tenets of clean needle technique and safe needle insertion as it related to acupuncture and moxibustion will also be covered. Prerequisites: BS521, BS525.

4 lecture hours, 4 semester hours

Further study in OM may be taken through the Acupuncture Institute. Concurrently refer to catalog section on Acupuncture.

Physical Medicine

PHYSICAL MEDICINE 512

Living Anatomy I: Massage.

This lecture and laboratory course addresses the palpation of bony landmarks and superficial muscles. It introduces the student to the musculo-skeletal system where equal emphasis is placed between the appendicular and axial skeleton. Students work in groups to identify muscle and bone relationships.

*1 lecture hour, 2 laboratory hours,
2 semester credits*

PHYSICAL MEDICINE 611

Hydrotherapy.

This course introduces students to the physiological principles underlying the therapeutic use of water, heat, and cold. In the laboratory portion of this course students learn procedures by administering and receiving treatments and determining appropriate applications. Prerequisites: BS521, BS525.

*1 lecture hour, 2 laboratory hours,
2 semester credits*

PHYSICAL MEDICINE 612

Physiological Therapeutics.

This course is an introduction to the physics and clinical use of heat, cold, high-volt galvanism, interferential current, low-volt galvanism, ultrasound, electrical muscle stimulation, diathermy, and paraffin. The student is instructed on the development of a clinical management plan utilizing adjunctive therapies. Prerequisites: BS525.

*2 lecture hours, 2 laboratory hours,
3 semester credits*

PHYSICAL MEDICINE 621

Living Anatomy II: Palpation.

In this course students integrate the knowledge of anatomy with the skills of palpation. Emphasis is placed on the muscular system. Basic soft tissue technique is taught as a way to understand muscular relationships. Students work in pairs to assess soft tissues and practice techniques. Prerequisite: BS511.

*1 lecture hour, 2 laboratory hours,
2 semester credits*

PHYSICAL MEDICINE 711

Naturopathic Manipulative Therapeutics I.

This course will be a basic presentation of the principles and mechanics of Manipulation of the spine. Lecture will include discussion of the neurological rationale for manipulation and reflexology. In addition various general methods of manipulation both hard and soft tissue will be reviewed. Palpation and other techniques of diagnosis for spinal malalignment will be introduced and practiced in addition to manipulative techniques. Prerequisites: PM511, PM621.

*2 lecture hour, 4 laboratory hours,
4 semester credits*

PHYSICAL MEDICINE 721

Naturopathic Manipulative Therapeutics II.

This course will extend NPM711 by introducing extremity manipulation and allowing time for spinal syndromes and other physical medicine therapeutic techniques to be reviewed and practiced in lab. Lab will generally reflect a practice time for all materials discussed in lecture with drills and repetition of pertinent material useful in the care of patients with physical medicine. Lecture will encompass pelvic and lumbar biomechanics principles as well as applications of meridian therapy, osteopathic cranial manipulative technique, pelvic distortion patterns, and other physical medicine entities. Prerequisites: PM711

*2 lecture hours, 4 laboratory hours,
4 semester credits*

PHYSICAL MEDICINE 821

Preventive/Therapeutic Exercise.

This course provides an overview of exercise as a preventative and therapeutic tool. Students are taught to perform a fitness assessment and describe and monitor exercise programs for persons with certain disease conditions. Prerequisite: PM721

1 lecture hour, 1 semester credit

Naturopathic Medicine

PHYSICAL MEDICINE 822

Orthopedics/Sports Medicine.

The diagnosis and treatment of disorders involving the skeletal system which can be safely treated in a general practice setting are discussed. Students practice taping, splinting and casting techniques. Prerequisites: PM 721

1.5 lecture hours, 1.5 semester credits

Psychology

PSYCHOLOGY 511

Physician Heal Thyself.

This course is designed to help students understand the stress, potential health effects and personal needs of their participation in a professional academic curriculum. This course emphasizes stress reduction, time management, and self-assessment.

1 lecture hour, 1 semester credit

PSYCHOLOGY 521

Counseling Skills and Techniques I.

This course provides an introduction to developing the naturopathic practitioner/patient relationship. Professional issues like ethics, confidentiality, trust, appropriate boundaries, and relationship building are included. Specific communication skills related to effective patient interviewing are practiced experientially via exercises within the class. Students practice the skills of attending, empathy, directional listening and focusing on important patient concerns.

2 lecture hours, 2 semester credits

PSYCHOLOGY 711

Counseling Skills and Technique II.

This course introduces the predominant holistic counseling theories and interventions through experiential study. Counseling skills with reference to actual case analysis are developed. Prerequisite: PS521.

1 lecture hour, 1 laboratory hour, 1.5 semester credits

PSYCHOLOGY 712

The Doctor/Patient Relationship.

This course deals with the issues which arise among professional care givers. It includes an examination of ethical issues,

confidentiality, development of trust, setting appropriate boundaries, and dealing with patients with chronic and life-threatening illnesses. Prerequisite: PS521.

0.5 lecture hours, 1 laboratory hour, 1 semester credit

PSYCHOLOGY 721

Psychological Assessment.

The primary focus of this course is the diagnosis of the various psychiatric disorders according to the Diagnostic and Statistical Manual of Mental Disorders. Included is the development of the DSM, psychological assessment considerations, and treatment modalities including psychotherapeutic, psychotropic, and alternative interventions. Prerequisite: PS521.

1.5 lecture hours, 1.5 semester credits

PSYCHOLOGY 811

Addictions and Disorders.

This course examines the diagnosis and treatment of specific addictions and disorders from a psychological, physiological and naturopathic point of view. Alcoholism, drug abuse, eating disorders and smoking are among the topics that are covered. Prerequisite: PS721.

1 lecture hour, 1 semester credit

Research

RESEARCH 811

Research I.

With the advice and guidance of their faculty research advisor, students plan and implement a research project of sufficient complexity and scope in an appropriate subject area, in conformity with guidelines adopted by the Research Committee. Prerequisite: RS511.

1 lecture hour, 1 semester credit

RESEARCH 821

Research II.

Students submit and present their research in conformity with guidelines adopted by the Research Committee. Prerequisite: RS811.

1 lecture hour, 1 semester credit

Clinical Education

CLINICAL EDUCATION 711

Clinical Education I.

Students begin to gain practical clinical skills by working under the supervision of licensed naturopathic physicians and other healthcare providers. Students learn through observation and are given limited responsibility in the clinical setting during this semester. Prerequisite: Clinic Entrance Exam.

12 laboratory hours, 6 semester credits

CLINICAL EDUCATION 721

Clinical Education II.

This is a continuation of the clinical work begun in Clinical Education I and involves the ongoing development of clinical skills and case management under supervision of licensed physicians. Students gradually assume responsibility as secondary care givers under the supervision of licensed physicians. Prerequisite: CE711.

12 laboratory hours, 6 semester credits

CLINICAL EDUCATION 731

Clinical Education III.

Clinic interns continue to perfect their clinical skills in preparation for having primary care responsibilities for patients for the following semester. Prerequisite: CE721.

8 laboratory hours, 4 semester credits

CLINICAL EDUCATION 811

Clinical Education IV.

Interns assume the role of primary care giver under the direct supervision of a licensed physician. Physical examination, diagnosis assessment and treatment skills are honed while specific performance objectives of clinical training are met. Prerequisite: CE731

20 laboratory hours, 10 semester credits.

CLINICAL EDUCATION 821

Clinical Education V.

In this final semester of clinical training students examine, diagnose and treat patients in preparation for providing primary care as a naturopathic physician. Prerequisite: CE811.

20 laboratory hours, 10 semester credits

Nutrition

NUTRITION 481

Nutritional Science.

The following nutritional science courses are offered only in the master's program in Nutrition. This program is available on the main campus and online.

- 560A Pathophysiologic Basis of Metabolic Disease
- 560B Biochemistry of Nutrition
- 560C Vitamins and Minerals
- 560D Clinical Biochemistry
- 560E Assessment of Nutritional Status
- 560F Nutritional Therapeutics
- 560H Developmental Nutrition
- 560J Research in Nutrition
- 560L Nutrition and Exercise
- 560M Biostatistics
- 560P Botanical Medicine
- 595N Independent Study

NUTRITION 560A

Pathophysiologic Basis of Metabolic Disease.

A study of the underlying mechanisms of disease and the complex interrelationships between critical systems including respiratory, urinary, cardiovascular, digestive, nervous and endocrine. Lectures will include fluid and electrolyte imbalances, acid and base imbalances, inflammation, hypersensitivity, infection, necrosis, and neoplasms. The influence of various nutrients on systemic function will be stressed. Prerequisite: Anatomy & Physiology I, II.
4 semester hours

NUTRITION 560B

Biochemistry of Nutrition.

A lecture course covering the static and dynamic aspects of the biochemistry of carbohydrates, lipids, amino acids, proteins, nucleic acids, cations, anions, enzyme kinetics, hormones and vitamins in the healthy individual. Integration and control mechanisms of the various metabolic pathways are particularly emphasized. Prerequisite: Introduction to Biochemistry.
4 semester hours

NUTRITION 560C

Vitamins and Minerals.

Basic and clinical aspects of nutrient ho-

meostasis concentrating on vitamin and mineral metabolism at the cellular and tissue level. Lectures will include specific functions, requirements, sources, assay methods, effects of deficiencies and excesses of each vitamin and mineral. Prerequisite: Nutrition 560B.
4 semester hours

NUTRITION 560D

Clinical Biochemistry.

A lecture course dealing with the biochemistry of disorders arising from acid/base imbalance and the abnormal metabolism of the carbohydrates, lipids, proteins, nucleic acids, bile pigments, vitamins, and hormones. Prerequisite: Nutrition 560B.
3 semester hours

NUTRITION 560E

Assessment of Nutritional Status.

Clinical and laboratory analytical procedures for evaluation of nutrient status, including blood and other tissue analysis, dietary records and questionnaires, case history, physical examination, anthropometric methods, etc.
3 semester hours

NUTRITION 560F

Nutritional Therapeutics.

A survey of diseases with primary or secondary nutritional implications and related nutritional strategies. For each disease covered, the etiology, pathology, epidemiology, and prevailing methods of treatment will be presented. The mechanism of action of various nutritional therapies and the role of nutrition in support of other treatments and modalities will be explored.
4 semester hours

NUTRITION 560H

Developmental Nutrition.

Nutritional considerations and health related concerns of growth and development. Special attention will be given to pregnancy/lactation, fetal/neonatal, and infant/pediatric stages of development. Nutritional needs of the adolescent and elderly will be discussed.
3 semester hours

NUTRITION 560J

Research in Nutrition.

Independent research project with faculty guidance, based on literature survey or

original research. Project approval is required. Prerequisite: Advanced standing, permission of advisor.

3 semester hours

NUTRITION 560L

Nutrition and Exercise.

An instructional class for nutritionists detailing proper dietary protocols for enhancing endurance and performance during exercise and sports. Elective.

3 semester hours

NUTRITION 560M

Biostatistics.

A description of analytical approaches for obtaining and interpreting biological data with emphasis on data analysis in the nutritional sciences. Biological variation, experimental design, data and fact differences, matching analysis to design, integrity in analysis, and bias in design and analysis will be considered in detail.

3 semester hours

NUTRITION 560P

Botanical Medicine.

A study of the use of herbs in nutritional practice. Discussions on individual herbs will include botany, mechanism of action, pharmacological/toxicological properties, clinical application, product standardization, and recommended dosages.

3 semester hours

NUTRITION 595N

Independent Study.

Opportunity for the graduate student to pursue advanced individual study in his field under the supervision of a specialist. No more than 6 semester hours may be taken in such study. Prerequisite: Permission of the Department Director.

1-6 semester hours

Technology Management

TECHNOLOGY MANAGEMENT 400

Cross-Functional Technology Management.

Introduces student to leadership concepts in cross-functional ("CF") management of technological innovation ("TI"). TI in most organizations requires re-alignment of the role of an organization's functional activi-

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ties. When successfully achieved, this activity generally requires the creation of a CF team. This course demonstrates the importance of CF to TI, and develops skills in the creation and leadership of successful CF teams.

3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 407

Contracting & Acquisition Management.

Principles and techniques for contracting and managing the acquisition of materials function. Focus is the acquisition of technology-based goods. Topics include the acquisition organization, policies and procedures, vendor selection processes, pricing considerations, quality and inventory management issues, and risk management.

3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 424

Quality Control Methods.

This course presents a comprehensive summary of methods for managing quality. The course objective is to develop an operational familiarity with contemporary methods found to be effective. Methods for every facet of the enterprise are considered. Topics covered include statistical process control, quality function deploy for every facet of the enterprise are considered. Topics covered include statistical process control, quality function deployment, concurrent design, the house of quality, and the Taguchi method. This course is intended for those students who do not intend to specialize in quality management.

3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 475

Quantitative Methods in Production Management.

This course presents an overview of quantitative methods for analyzing production and distribution operations. The course objective is to develop an operational capability with the application of commonly used methods of analysis. Major emphasis is given to the use of linear programming and simulation. Methods are presented within the framework of analyzing contemporary problems in production and distribution. This course is intended for those who do not have any prior exposure to the methods covered.

3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 484

Product Costing & Economic Analysis of Investments.

This course covers three areas: (1) the development and use of standard financial statements; (2) standard methods and their application for the measurement economic value creation; and (3) methods for computing both product costs and costs to serve differing customer types for multi-product manufacturers serving a wide range of customer types. Topics include financial statement analysis from several perspectives; discounted cash flow and associated investment decision techniques such as net present value and internal rate of return; and transaction based product and customer service costs.

3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 494

Valuation of Real & Financial Investments.

This course introduces economic analysis tools to be used by the technical staff in proposing wealth creation projects and enterprises. Topics include discounted cash flow, capital budgeting, cost of money, enterprise valuation and the use of options in defining R & D budgets. Prerequisite: MGE 484.

3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 500

Graduate Co-op in Technology Management.

By arrangement.

1 semester hour

TECHNOLOGY MANAGEMENT 505

Project Management.

A managerial approach to the planning, implementation and effective control of resources involved in a project, whatever the product or industry. Includes project evaluation, planning, scheduling, and control. Criteria for additional support or termination. Course uses modern computer based project management software.

3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 508

Marketing Technology-Based Products.

This course introduces marketing concepts, especially those associated with products in which technology plays a major role in their competitive positioning. Students are required to complete a detailed marketing study for inclusion in a

business plan required for completion of the masters program.

3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 521

Technology & the Competitive Enterprise.

Studies the use of technology as the primary means of improving competitive advantage. Examination of the general rules of success in business based on the data from such studies as PIMS, and an investigation of the role of technology within these rules. Case studies are used to demonstrate both successful and unsuccessful attempts to employ technology as a means to improve competitive advantage.

3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 540

Advanced Simulation Techniques.

An in-depth study of the use of simulation as an analysis tool for the study of production and distribution processes. Alternative simulation programs are reviewed. One program, SIMNET, is used to study a variety of production and distribution management issues. Extensive use of computer simulation required.

3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 555

Contemporary Problems in Technology Management.

This course number is used to present current topics as they arise from time to time. Each such topic will be offered under an appropriate title with this course number.

1-3 semester hours

TECHNOLOGY MANAGEMENT 560

Product/Service Planning.

This course integrates the concepts taught throughout the masters program. The student is required to develop a detailed business plan for an enterprise that creates wealth. The course process requires that the student incorporate requirements from other courses taken into one single clear plan and proposal for investment. At the end of this course the student is required to make a formal presentation to the Department student body. Because this course does integrate material from other courses, students are required to enroll in at least one credit hour in every semester in which other courses are taken, and enroll for at least one credit in the final semester

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in which a presentation will be made.
3 lecture hours; 3 semester hours

TECHNOLOGY MANAGEMENT 597

Advanced Problems in Management Engineering.

Hours and topics to be arranged.
3 semester hours

TECHNOLOGY MANAGEMENT 598

Thesis in Technology Management.

Hours and topics to be arranged.
1-6 semester hours

TECHNOLOGY MANAGEMENT 599

Independent Study in Technology Management.

Independent study of advanced topics in Technology Management and submission of project report as required. Problem assignment and semester hours to be arranged with and approved by the Department Chair.
1-3 semester hours