

Once accepted to the program, a student must complete each Surgical Technology-specific course (those courses with an AHST with a minimum grade of 'C' (80%) in order to continue in the ST program. All other required courses must also be passed with a grade of "C". Course grading scales may vary. If a student does not pass the required courses, he/she will not be able to continue in the program and will need to apply for readmission. If a student is re-admitted, he/she will be required to complete skills labs, AHST 115 (SUR 102T) and AHST 215 (SUR 202T), to ensure sterile technique skills are acceptable for patient care. A student may take any required course a maximum of two (2) times.

A student will become a member of the Association of Surgical Technologists (www.ast.org) during the first year in the program. A student anticipating program completion will write the National Certification Exam prior to graduation. A student who successfully completes the ST program is awarded an A.A.S. degree in Surgical Technology. The credential of Certified Surgical Technologist (CST) will be awarded to a student upon passing the National Certification Exam and graduation from the ST program. The credential of Certified is awarded by the National Board of Surgical Technology and Surgical Assisting (NBSTSA).

Students are required to rotate sites during the clinical portion of their education. During the last semester of the program, internships may be outside the Missoula area. Transportation and housing are the student's responsibility. Prior to entering a healthcare facility for clinical experiences, a student will be required to submit a background check. Many healthcare facilities have increasingly stringent requirements. A student could be refused entry into a clinical facility based on information disclosed in a background check. If this is a concern for you, please consult the Program Director.

The University of Montana College of Technology Surgical Technology Program also has Outreach campuses in Butte and Billings. The Butte site is the Montana Tech of The University of Montana College of Technology campus in collaboration with St James Healthcare. The Billings site is the Montana State University-Billings College of Technology campus in collaboration with St Vincent Healthcare and Billings Clinic. Students at those sites take the equivalent prerequisite courses on their respective campuses. The Surgical Technology-specific courses begin spring semester. Students must apply to the ST program by October 1. Students may apply while enrolled in the prerequisite courses with acceptance to the program to be determined after fall grades are finalized. The classroom portion of the ST program curriculum is delivered in web-based format using the Moodle course delivery system from the Missoula campus. Lab and clinical courses are conducted on each Outreach campus. Outreach students are required to travel to Missoula to write the National Certification Exam and to participate in Commencement exercises. Prospective students may contact the Health Professions' Office at 406-243-7868 for more information regarding the ST Program on the Butte and Billings campuses. Please refer to the specific course catalogs on the Butte and Billings campuses for prerequisite requirements.

The ST program is accredited by the Committee on Accreditation of Allied Health Education Programs (CAAHEP), 1361 Park St., Clearwater, FL 33756; phone 727-210-2350, www.caahep.org.

AA Prerequisite Courses

A student may apply to the program either following completion of the prerequisite courses or during the semester completing the courses. Any required course may be attempted a maximum of two (2) times.

WRIT 121 (WTS 115) Introduction to Technical Writing or WRIT 101 (WTS 101) College Writing I	3
BIOH 201N/202N (SCN 201N) Anatomy and Physiology & Lab	4
CAPP 120 (CRT 100) Introduction to Computers	3
M 105 Contemporary Math	3
AHMS 144 (MED 154T) Medical Terminology	3
PSYX 100S (PSY 100S) Introduction to Psychology	4
Total	20

Surgical Technology Program Curriculum:

First Year	A	S
BIOM 250N (BIOL 106N) Microbiology for Health Sciences	-	3
BIOH 211N-212N (SCN 202N) Anatomy and Physiology II & Lab	-	4

AHST 115 (SUR 102T) Surgical Lab I	- 2
AHST 101 (SUR 101T) Introduction to Surgical Technology	- 3
AHST 154 (SUR 154) Surgical Pharmacology	- 3
Total	- 15
Second Year	
	A S
AHST 200 (SUR 200) Operating Room Techniques	5 -
AHST 201 (SUR 201) Surgical Procedures I	4 -
AHST 215 (SUR 202T) Surgical Lab II	2 -
AHST 250 (SUR 203T) Surgical Clinical I	4 -
AHMS 270E (MED 280E) Medical Law and Ethics	3
AHST 202 (SUR 202T) Surgical Procedures II	- 5
AHST 251 (SUR 206T) Surgical Clinical II	- 5
AHST 298 (SUR 290T) Surgical Internship	- 5
Total	18 15

Please note: Surgical Technology course numbers, titles and rubrics have changed.

Courses

U = for undergraduate credit only. R after the credit indicates the course may be repeated for credit to the maximum indicated after the R. Credits beyond this maximum do not count toward a degree.

Allied Health Medical Support (AHMS)

U 144 (AHMS 144T) Medical Terminology 3 cr. Offered autumn and spring. Introduction to a medical word building system using Greek and Latin word roots, combining forms, suffixes, and prefixes.

U 216 (PHA 160) Pharmaceutical Products 3 cr. Offered autumn. Fundamental principles of pharmacology and the implications of medication use. Includes the law as it pertains to drug use, dosage forms, routes of administration as well as the pharmacologic actions and uses of drugs.

U 191 (MED 195T) Special Topics 1-6 cr. (R-6)

U 220 (MED 161T) Medical Office Procedures 4 cr. Offered autumn. An introduction to the necessary skills and qualities required to function successfully in the medical arena. Emphasis on medico-legal and ethical responsibilities, records management and financial management of the medical practice, and interpersonal communications to include patient reception, telephone techniques and appointment scheduling.

U 270E (MED 280E) Medical Law and Ethics 3 cr. Offered every term. Ethical decision-making tools for addressing common ethical issues in the health professions.

Surgical Technology (AHST)

U 101 (SUR 101T) Introduction to Surgical Technology 3 cr. Offered spring. Prereq., admission to the program. Provides an orientation to the scrub and circulatory roles of the surgical technologist in the preoperative, intraoperative and postoperative periods. Entry level skills and theories are emphasized.

U 115 (SUR 102T) Surgical Lab I 2 cr. Offered spring. Prereq., admission to the program. Demonstration of sterile technique in the campus lab, various skills and their application in the operating room.

U 154 (SUR 154) Surgical Pharmacology 3 cr. Offered spring. Prereq., admission to the program, M 090 (MAT 005). Basic overview of the medications that are commonly used before, during and after a surgical procedure.

U 200 (SUR 200) Operating Room Techniques 5 cr. Offered autumn. Prereq., completion of all second semester courses. Focus on the scrub and circulator roles of the surgical technologist in the preoperative, intraoperative, and postoperative periods. More complex skills and theories; impact of new technologies in the 21 century st operating room.

U 201 (SUR 201) Surgical Procedures I 4 cr. Offered autumn. Prereq., completion of all second semester courses. A study of surgical procedures following the patient through the preoperative, intraoperative, and post-operative

stages of specific surgical specialties.

U 202 (SUR 205) Surgical Procedures II 5 cr. A study of surgical procedures following the patient through the preoperative, intraoperative, and postoperative stage of CV/thoracic, orthopedic, neurological, and ophthalmic specialties.

U 215 (SUR 202) Surgical Lab II 2 cr. Offered spring. Demonstration of more complex skills in the campus lab, including assistant circulating, and their application in the operating room.

U 250 (SUR 203) Surgical Clinical I 4 cr. Offered autumn. Prereq., completion of all second semester courses and successful completion of AHST 215 (SUR 202T). Perioperative experience in the minor surgical procedure role through a supervised clinical hospital rotation.

U 251 (SUR 206) Surgical Clinical II 5 cr. Offered spring. Prereq., completion of all third semester courses. Perioperative experience in the major surgical procedure role through a supervised clinical hospital rotation.

U 298 (SUR 290) Surgical Internship 5 cr. Offered spring. Prereq., successful completion of AHST 202, 251T (SUR 205T, SUR 206T). Capstone experience in the perioperative role in preparation for initial employment, increasing occupational awareness and professionalism. Students take call for emergency surgeries alongside experienced hospital staff.

Radiologic Technology (AHXR)

U 100 (RAD 110) Introduction to Diagnostic Imaging 3 cr. Offered fall. Introduction to the field of radiology and its mix of technical equipment, lab work, hospital environment, patient care and team work.

U 121 (RAD 121) Radiographic Imaging I 4 cr. Offered spring. Introduction to fundamental physics principles underlying radiology and diagnostic x-ray production. Topics include electromagnetic waves, electricity and magnetism, electrical energy, and power and circuits as they relate to radiography. Factors of image quality and exposure methods: density, contrast, recorded detail, distortion, technique charts, manual and automatic exposure control, and tube rating charts.

U 140 (RAD 111) Radiographic Methods 3 cr. Offered fall. Preparation in the procedures associated with radiology in standard radiographic environments.

U 191 (RAD 195) Special Topics Variable cr.

U 192 (RAD 196) Independent Study Variable cr.

U 195 (RAD 151) Radiographic Clinical: I 8 cr. Offered spring. Introduction to patient management and basic radiographic procedures in the clinical setting. Emphasis on mastering positioning of the chest and extremities, manipulating equipment, and applying principle of ALARA.

U 195 (RAD 161) Radiographic Clinical: II 8 cr. Offered summer. Continued patient management and basic radiographic procedures in the clinical setting. Emphasis on mastering positioning of the chest and extremities, manipulating equipment, and applying principle of ALARA.

U 221 (RAD 222) Radiographic Imaging II 3 cr. Offered autumn. Offers students more technical and detailed information on the use of image receptor systems, processing principles, advanced digital imaging systems and imaging modalities used in radiology.

U 225 (RAD 241) Radiobiology/Radiation Protection 2 cr. Offered autumn. Principles of radiation protection and radio biology. Topics include the effects of ionizing radiation on body tissues, protective measures for limiting exposure to the patient and personnel, and radiation monitoring devices.

U 240 (RAD 112) Radiographic Methods II 3 cr. Offered spring. Knowledge and skills necessary to perform

standard and specialty radiographic procedures. Emphasis on radiographic specialty procedures, pathology, and advanced imaging.

U 270 (RAD 245) Radiographic Registry Review 2 cr. Offered spring. An overview of imaging concepts as a review for the national certification test. Topics include a systematic approach for image evaluation, patient care, radiation protection and the physics of radiographic imaging.

U 291 (RAD 291) Special Topics Variable Credit

U 295 (RAD 251) Radiographic Clinical: III 8 cr. Offered autumn. Experience in patient management specific to fluoroscopic and advanced radiographic procedures. Emphasis on applying appropriate technical factors to all studies and positioning of gastrointestinal and urological studies.

U 295 (RAD 251) Radiographic Clinical: IV 9 cr. Offered spring. Advanced experience in patient management specific to fluoroscopic and advanced radiographic procedures. Emphasis on applying appropriate technical factors to all studies and positioning of gastrointestinal and urological studies.

U 298 (290T) Internship

Nursing (NRSG)

U 100 (NUR 101) Introduction to Nursing 1 cr. Offered each semester. This online course is a prerequisite to the Practical Nursing program. Student will be presented with an introductory level of the core concepts of nursing practice and other issues such as the legal concerns and ethical/cultural issues that face professional nurses on a consistent basis.

U 110 (NUR 105) Dosage Calculation for Health Professions 2 cr. This course is intended to provide the student the theory and psychomotor skills to correctly and safely calculate medications for clients in diverse health care settings. It will prepare students for the calculations used in health care professions. Students will review various systems of weights and measures (metric, apothecary, and household), conversions between these systems, ratio/proportions, dosage calculations, percentage preparations, reducing and enlarging formulas, dilution, concentrations, and intravenous flow rates.

U 130 (NUR 110) Fundamentals of Nursing 7 cr. Offered autumn and spring. Prereq: acceptance into the Practical Nursing Program. Introduces learners to the clinical skills essential for the nursing role. Also includes complex concepts and behaviors of nursing roles within the context of the nursing process, holistic care and health care. Emphasizes the theoretical and practical concepts of nursing skills required to meet the needs of clients in a variety of settings.

U 131 (NUR 103) Fundamentals of Nursing Lab 3 cr. Offered autumn and spring. Prereq., SCN 201N-202N, M 115 (MAT 117), WRT 101 (WTS 101), SCN 150N, PSYX 100S (PSY 100S), CHMY 121N (CHEM 151) with lab, and acceptance into the practical nursing program. Introduces the student to basic principles and psychomotor skills to provide a framework for developing initial competencies in patient care. Campus lab experience is used initially. Off campus clinical experience in a long term care setting completes the hands on portion. Successful students are qualified to apply for certification as certified nurse assistants.

U 135 (NUR 125) Nursing Pharmacology 3 cr. Offered autumn and spring. Prereq: acceptance into the Practical Nursing Program. Students learn a structured systematic approach to the study of drug therapy through caring, communication, professionalism, critical thinking, and clinical judgment. Medications are studied according to drug classes, and therapeutic families. Students will learn to apply the nursing process to drug therapy with an emphasis on accessing relevant information to ensure client safety.

U 138 (NUR 146) Gerontology for Nursing 2 cr. Offered autumn and spring. Prereq: acceptance into the Practical Nursing Program. Introduces the student to the skills and knowledge needed to provide nursing care to aging clients. Topics explored include current trends (including legal and ethical issues) in gerontological nursing,

developmental stages and transitions associated with aging, expected age-related physiological changes, and assessment findings, recognition and management of acute and chronic illness that commonly occur in the older adult population, promotion of health for the older adult client, end-of-life issues and care.

U 139 (NUR 146) Gerontology for Nursing Clinical 2 cr. Offered autumn and spring. Prereq., acceptance into the Practical Nursing Program. Introduces the student to the skills and knowledge needed to provide nursing care to aging clients. Topics explored include current trends (including legal and ethical issues) in gerontological nursing, developmental stages and transitions associated with aging, expected age-related physiological changes, and assessment findings, recognition and management of acute and chronic illness that commonly occur in the older adult population, promotion of health for the older adult client, end-of-life issues and care.

U 140 (NUR 156) Core Concepts of Adult Nursing 7 cr. Offered spring and autumn. Prereq: successful completion of semester 1 of the PN nursing program. Prepares the student to care for clients experiencing common, well-defined health alterations in settings where stable clients are anticipated. Students are introduced to standardized nursing procedures and customary nursing and collaborative therapeutic modalities.

U 141 (NUR 156) Core Concepts of Adult Nursing Clinical 7 cr. Offered spring and autumn. Prereq., successful completion of semester 1 of the PN nursing program. Prepares the student to care for clients experiencing common, well-defined health alterations in settings where stable clients are anticipated. Students are introduced to standardized nursing procedures and customary nursing and collaborative therapeutic modalities.

U 142 (NUR 168) Core Concepts of Maternal/Child Nursing 3 cr. Offered autumn and spring. Prereq: successful completion of semester 1 of the PN nursing program. Information about fetal development and prenatal and postnatal care of the mother and newborn emphasizing caring, communication, professionalism, and critical thinking. Role of the nurse in meeting the needs of the family is emphasized. Clinical application of caring for the mother and newborn will allow the student to demonstrate acquired knowledge.

U 143 (NUR 160) Core Concepts Maternal Child Nursing Clinical 3 cr. Offered intermittently. Prereq: all first semester practical nursing courses and consent of instr. Capstone course that allows the student to work collaboratively with an identified LPN preceptor, performing the role expectations for care in that workplace setting.

U 144 (NUR 155) Core Concepts of Mental Health Nursing 2 cr. Offered autumn and spring. Prereq: successful completion of semester 1 of the PN nursing program. Exploration of physiological, psychological, sociocultural, spiritual, and environmental factors associated with mental health/illness affecting individuals and families. Focus will be placed on basic concepts of psychiatric nursing, therapeutic modalities, as well as psychiatric disorders including psychopharmacological management.

U 147 (NUR 170) Practical Nursing NCLEX Review 2 cr. Offered autumn and spring. Prereq: Successful completion of all courses in the first semester of the practical nursing program. Preparation for the national test for LPN licensure.

U 148 (NUR 173) Leadership Issues 2 cr. Offered autumn and spring. Prereq: successful completion of semester 1 of the PN nursing program. Capstone course that provides the Practical Nursing student information regarding the current status of vocational nursing. There is a forty-five hour clinical/precepted component to provide the student opportunity to apply theoretical knowledge in the long-term care setting.

U 149 (NUR 173) Leadership Issues Clinical 2 cr. Offered autumn and spring. Prereq., successful completion of semester 1 of the PN nursing program. Capstone course that provides the Practical Nursing student information regarding the current status of vocational nursing. There is a forty-five hour clinical/precepted component to provide the student opportunity to apply theoretical knowledge in the long-term care setting.

U 191 (NUR 195) Special Topics Variable cr. (R-6)

U 192 (NUR 196T) Independent Study 1-6 cr. (R-6) Offered intermittently.

U 250 (NUR 240) LPN to RN Transition 2 cr. Offered autumn and spring. Prereq., admission to the registered nursing program and current unencumbered LPN license. Focus on the role transition from LPN to RN in relation to the concepts and principles of holistic nursing care. Focus is on the continuing development of roles and responsibilities of the RN as defined by the scope of practice standards, nursing theory and conceptual models.

U 252 (NUR 268) Complex Care Maternal/Child Client 3 cr. Offered spring and autumn semester. Prepares the student to provide care to maternal/child clients experiencing acutely changing conditions in settings where outcomes are less predictable. Topics include care of the client during childbirth, high-risk pregnancies, obstetrical emergencies, neonatal emergencies, and infants and children requiring complex collaborative care.

U 253 (NUR 268) Complex Care Maternal/Child Client Clinical

U 254 (NUR 255) Complex Care Mental Health Client 2 cr. Offered spring and autumn. Explores physiological, psychological, sociocultural, spiritual and environmental factors associated with mental health/illness. Focus is placed on psychotherapeutic management in the continuum of care, milieu management and special populations with emphasis on individuals, families and communities.

U 255 (NUR 255) Complex Care Mental Health Client Clinical

U 256 (NUR 230) Pathophysiology 3 cr. Offered spring and autumn. Prereq: successful acceptance into the ASRN Nursing Program. An introduction to the basic principles and processes of pathophysiology including cellular communication, genes and genetic disease, forms of cellular injury, fluid and electrolyte/acid base balance, immunity, stress coping and illness, and tumor biology. Pathophysiology of the most common alterations according to body system will also be discussed as well as the latest developments in research related to each area.

U 262 (NUR 256) Complex Care Needs - Adult Client 4 cr. Offered spring and autumn. Prepares the student to provide nursing care to adult client's experience acutely changing conditions in setting where outcome is less predictable. Emphasis is placed on the nurse's response to emergent/life-threatening/rapidly changing conditions. Topics covered include collaborative therapeutic modalities related to acute/complex neurological, cardiac, respiratory, hematological, endocrinologic events, shock, sepsis/SARS, complex burns, etc.

U 263 (NUR 256) Complex Care Needs - Adult Client Lab

U 265 (NUR 270) Advanced Clinical Skills 1 cr. Offered spring and autumn. Prepares students to carry out complex nursing interventions. Topics covered include central venous therapy, parenteral nutrition hemodynamic monitoring, advanced airway/ventilator support, intracranial pressure monitoring, IV medication administration, high risk IV infusions, blood/blood product administration, conscious sedation, advanced wound care, etc.

U 266 (NUR 290) Managed Client Care 4 cr. Offered spring and autumn. Covers topics related to integrated nursing care of individual clients and groups as well as basic principles related to supervision of nursing practice and management of resources.

U 267 (NUR 290) Managed Client Care Clinical

U 291 (NUR 295T) Special Topics Variable cr.

U 292 (NUR 296T) Independent Study Variable cr. (R-6)

Pharmacy (PHAR)

U 100 (PHA 100) Introduction to Pharmacy Practice for Techs 3 cr. Offered autumn. Prereq., admission into Pharmacy Technology program. This course offers information regarding careers in pharmacy. It includes the history of pharmacy practice and defines roles of personnel relating to pharmaceutical services. Ethical standards of the occupation and federal and state laws regulating pharmacy practice with emphasis on Montana State Pharmacy Law regulating pharmacy technicians are studied. Day-to-day operations including preparation, maintenance, and storage of pharmaceuticals and records, and basic concepts of computer operations and latest technologies are

reviewed. Skills will be developed with are necessary for the pharmacy technician to communicate effectively in the following ways: 1) as a representative of the profession of pharmacy, 2) as an intermediary between the pharmacist and patient, and 3) as an intermediary between the pharmacist and other health care professionals.

U 101 (PHA 101) Pharmacy Calculations 3 cr. Offered autumn. Calculations used in pharmacy practice; includes various systems of weights and measures, dosage determinations, percentage preparations, reducing and enlarging formulas, dilution, and concentration.

U 102 (PHA 102) Pharmacology for Technicians 6 cr. Offered autumn. Prereq., admission into Pharmacy Technology program. Study of the properties, reactions, and therapeutic value of the primary agents in the major drug classes.

U 104 (PHA 195) Pharmacy Dispensing Lab 4 cr. Offered autumn. Prereq., admission into Pharmacy Technology Program. Develop dispensing and distributive skills with hands-on lab, and lecture format.

U 120 (PHA 110) Medication Safety 3 cr. Offered spring online only. Prereq., PHAR 100, 101, 102, 104 (PHA 100, 101, 102, 103) and second semester standing in Pharmacy Technology Program. This course will introduce students to national safety initiatives developed by the Institute of Medicine, The Joint Commission, The Institute of Safe Medicine Practices and others. This awareness will help students become part of the solution in promoting safe medication practices.

U 191 (PHA 195) Special Topics 1-6 cr. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 192 (PHA 196) Independent Study 1-6 cr. (R-6) Offered intermittently.

U 198 (PHA 106) Internship: Pharmacy Technology Retail Internship 4 cr. Offered spring. Prereq., PHAR 100, 101, 102, 104 (PHA 100, 101, 102, 103) and second semester standing in Pharmacy Technology Program. Training and experience in retail and related pharmacy settings under supervision of a pharmacist. Emphasizes practical experience in outpatient dispensing.

U 198 (PHA 107) Internship: Pharmacy Technology Alternative 4 cr. Offered spring. Prereq., PHAR 100, 101, 102, 104 (PHA 100, 101, 102, 103) and second semester standing in Pharmacy Technology Program. Training and experience in either hospital, compounding, home infusion, nursing home or other alternative pharmacy settings under supervision of a pharmacist. Emphasizes special skills unique to that pharmacy setting.

Respiratory Care (RES)

U 101T Communication And Management 1 cr. Offered autumn. Prereq., Acceptance into Respiratory Care Program. Study of respiratory care departmental organization and administration procedures, effective communication strategies, and legal and ethical issues for the Respiratory care professional.

U 115T Blood Gas Analysis 2 cr. Offered autumn. Prereq., acceptance into the Respiratory Care program. Study of the indications, rational, methods, instrumentation, and analysis of Blood Gases. Emphasis will be placed on the physiology and clinical implications of acid-base abnormalities.

U 129T Patient Care and Assessment 4 cr. Offered autumn. Prereq., BIOH 201N-202N (SCN 201N-202N). Introduction to nursing- related knowledge and skills with emphasis on application of microbiology to aseptic technique. Assessment of the respiratory system with cardiopulmonary diagnostic and laboratory tests interpretation. Observation and interpretation of overall patient condition is integrated throughout the course.

U 130T Respiratory Care Laboratory IB 1 cr. Offered autumn. Prereq., acceptance into the Respiratory Care program. Basic clinical competencies taught in RES 129 are studied in a laboratory setting. Peer and instructor review of competencies included. Students focus on patient assessment skills and techniques/equipment.

U 131T Respiratory Care Fundamentals 5 cr. Offered autumn. Prereq., acceptance into the Respiratory Care

program. Orientation to basic respiratory care science including the application of principles of physics and chemistry. Emphasis on theory, operation and troubleshooting of equipment used at the entry level of practice. Microbiology in relation to equipment processing, pulmonary rehabilitation and home care included.

U 133T Respiratory Care Pharmacology 3 cr. Offered winter. Prereq., acceptance into the Respiratory Care Program or consent of instr. Principles of basic chemistry introduced with an application to pharmacology as related to the pulmonary system. Cardiovascular and related pharmacology studied in preparation for ACLS and ventilator management.

U 150T Respiratory Care Laboratory I 1 cr. Offered autumn. Prereq., acceptance into the Respiratory Care program. Basic clinical competencies taught in RES 131 are studied in a laboratory setting. Peer and instructor review of competencies included. Students earn their BLS certification.

U 231T Respiratory Critical Care 4 cr. Offered spring. Prereq., RES 120, 129, 131, 133, 150. Continuation of RES 131. Physiology, indication, contraindications, and application of mechanical ventilation. Emphasis on patient assessment, monitoring, stabilization and weaning during assisted pressure breathing. Analysis of the various modes of ventilation, including optimizing the patient-ventilator interface in the adult through various advanced airway techniques.

U 232T Respiratory Pathology and Disease 3 cr. Offered spring. Prereq., RES 120, 129, 131, 133, 150. Special lectures in medicine and disease as related to the cardiopulmonary system. Emphasis on recognition of signs and symptoms of disease and implications for treatment through the study of selected case studies.

U 235T Cardiopulmonary Anatomy and Physiology 3 cr. Offered spring. Prereq., RES 120, 129, 131, 133, 150 or consent of instr. Principles of physiologic chemistry are introduced and applied to the macro and micro anatomy of the cardiopulmonary system with a focus on structure and function. Application made to pathology and assessment of patients receiving mechanical ventilation.

U 241T Perinatal and Pediatric Respiratory Care 3 cr. Offered autumn. Prereq., RES 260, 265. Study of perinatal and pediatric respiratory care with emphasis on assessment, resuscitation and mechanical ventilation of the neonate and pediatric patient. The theory of Neonatal Resuscitations (NRP) will be presented. Neonatal and pediatric diseases will be studied.

U 250T Respiratory Care Laboratory II 2 cr. Offered spring. Prereq., RES 120, 129, 131, 133, 150. A continuation of RES 150 with emphasis on adult critical care. Clinical competencies taught in RES 231 and RES 235 are studied in a laboratory setting. Peer and instructor review of competencies included.

U 252T Respiratory Care Review 2 cr. Offered autumn. Prereq., RES 260, 265. A review of respiratory care in preparation for credentialing exams. Students must take an Entry Level Self-Assessment Exam, a Written Registry Self-Assessment Exam, and a Clinical Simulation Self-Assessment Exam.

U 255T Clinical Experience I 5 cr. Offered spring. Prereq., RES 120, 129, 131, 133, 150. Emphasis on the student directly performing basic clinical skills in a patient care setting to include hospitals, home care, and pulmonary function laboratories. Students also participate in physician rounds.

U 260T Respiratory Care Laboratory III 1 cr. Offered summer. Prereq., RES 231, 232, 235, 250, 255. Students study principles and theory of advanced life support. Peer and instructor review are included. Students will be Advanced Cardiac Life Support (ACLS) and Pediatric Advance Life Support (PALS) certified at the end of this class.

U 265T Clinical Experience II 5 cr. Offered summer. Prereq., RES 231, 232, 235, 250, 255. Continuation of clinical skills learned in RES 255. Introduction to adult critical care along with sleep and cardiac diagnostics. Students also participate in physician rounds.

U 270T Respiratory Care Laboratory IV 1 cr. Offered autumn. Prereq., RES 260, 265. Emphasis on neonatal and pediatric critical care. Clinical competencies introduced in RES 241 are studied. Peer and instructor review of

competencies are included.

U 275T Clinical Experience III 6 cr. Offered autumn. Prereq., RES 260, 265, 270. Continuation of RES 265 with critical care of the adult. Neonatal and pediatric critical care experiences are emphasized. Students also participate in physician rounds.

Department of Industrial Technology

Interim Chair 2011-2012

The mission of the Department of Industrial Technology is to provide the regional workforce with credentialed, skilled, and competent entry-level technicians, and to be responsive to emerging workforce needs. The Department encourages the development of teamwork and interpersonal communication skills required in the workplace. It also stresses the importance of a strong work ethic and the value of continuing education and lifelong learning. The instruction for the Department of Industrial Technology Certificate of Applied Science and Associate of Applied Science (A.A.S.) degree programs are primarily delivered at the West Campus at 3639 South Avenue West. Some instruction is delivered at the East Campus or Mountain Campus.

All students admitted to Industrial Technology programs are required to submit writing and math placement scores immediately upon admission to the College of Technology or make arrangements to take these assessments as soon as possible. Thereafter, students needing to take a math and/or writing assessment should contact the Academic Support Center at 406-243-7826 to schedule an appointment to take the placement assessments as soon as possible. Students who live outside of the Western Montana area may take a math and writing assessment at their local community college. Contact the Academic Support Center at 406-243-7826.

Special Certificate and Degree Requirements

The general education requirements are included in the following courses of study. Refer to the Academic Policies and Procedures section of this catalog for the specific requirements.

Course Fees, Tools, and Supplies

Courses in all programs in the Department of Industrial Technology include additional course fees and require special tools and supplies for which students must pay. To obtain a complete listing of these additional items and costs, contact the program directors.

Building Maintenance-Certificate of Applied Science

The mission of the Building Maintenance Program is to provide the regional workforce with credentialed, skilled and competent building maintenance professionals, and to be responsive to emerging workforce needs.

Students in the Building Maintenance program are trained as building maintenance professionals who maintain commercial buildings. Subject matter in the program includes plumbing, electricity, carpentry, and heating/air conditioning. Students learn physical and electrical theories that enable them to understand building systems. In addition, they study building cleaning, landscape maintenance, pool care, computers, and boiler operation. Water treatment is discussed in both the pool and boiler courses. The program introduces current environmental and energy problems that can be reduced through efficient building operation. It also encourages resource development, teamwork and interpersonal skills required on the job.

Students are awarded a Certificate of Applied Science upon successfully completing the program. Contact John Walker, Program Director, at 406-243-7645 or john.walker@umontana.edu for more information.

Autumn and Spring Entry:

	Course	A	S
BME 122T Electricity		-	5
BME 123T Carpentry		6	-

BME 127T Low Pressure Boilers	- 3
BME 128T Maintenance	6 -
BME 130T Heating and Air Conditioning	- 6
CAPP 120 (CRT 100) Introduction to Computers	3 -
M 111 (MAT 110T) Technical Mathematics	3 -
PSYX 163 (PSY 105T) Work Attitudes	- 1
WRIT 121 (WTS 115) Introduction to Technical Writing or WRIT 095 (WTS 100) Developmental Writing	- 3
Total	18 18

Carpentry - Certificate of Applied Science and A.A.S. Degree

The mission of the Carpentry Program is to provide the regional workforce with credentialed, skilled and competent carpenters and to be responsive to emerging workforce needs.

The Carpentry program provides students the opportunity to learn carpentry skills in a competency-based learning environment. Students work hand-in-hand with professional carpenters both on campus and at construction sites.

Students use hand and power tools with blueprints to build foundation forms, frame buildings, side and roof buildings, and apply roofing materials. They install windows, doors, stairs, attic vents, insulation, vapor barriers, and drywall. Students learn methods for installing trim, locksets, suspended ceilings, countertops, cabinets, and flooring. They also learn to operate construction equipment.

In addition to general education courses, students in the program learn the various steps of becoming a carpenter, including safe practices. Students construct real-world projects and can earn a Certificate of Applied Science or an Associate of Applied Science degree from The University of Montana. The program often has a waiting list. Prospective students are encouraged to apply one year prior to anticipated school attendance. Contact Dennis Daneke, Program Director, at 406-243-7692 or Dennis.Daneke@umontana.edu for more information.

Autumn Entry:

First Year	A S
CSTN 102 (CAR 130T) Concrete Carpentry	4 -
CSTN 120 (CAR 120T) Carpentry Basics & Rough in Framing	5 -
CSTN 122 (CAR 121T) Beginning Carpentry Lab	5 -
CSTN 142 (CAR 140T) Interior and Exterior Finish Carpentry	- 4
CSTN 143 (CAR 141T) Intermediate Carpentry Lab	- 4
BMGT 242T (BUS 242T) Front Line Supervision	- 3
CAPP 120 (CRT 100) Introduction to Computers	3 -
M 111 (MAT 110T) Technical Mathematics	- 3
WRIT 101 (WTS 101) College Writing I	- 3
Total	21 17

Successful completion of the courses listed above results in the award of a Certificate of Applied Science in Carpentry.

Second Year	A S
CSTN 205 (CAR 220T) Advanced Carpentry	- 6
CSTN 206 (CAR 221T) Advanced Carpentry Lab	- 2
CSTN 261 (CAR 230T) Building Management	4 -
CSTN 276 (CAR 236T) Building for Solar Energy	3 -
CSTN 277 (CAR 240T) Alternative Construction Materials	3 -
CSTN 278 (CAR 241T) Applied Building Practices	- 6
CSTN 299 (CAR 231T) Capstone: Carpentry	2 -
CRT 182T Computer Aided Design & Drafting.	3 -
WLDG 103 (WEL 119T) Welding Fund Construction Trades	- 2
Total	15 16

Successful completion of the first and second year courses listed above results in the awarding of an Associate of Applied Science Degree in Carpentry.

Diesel Technology- A.A.S. Degree

The mission of the Diesel Technology Program is to provide the regional workforce with credentialed, skilled and

competent diesel technicians and to be responsive to emerging workforce needs.

Students in the Diesel Technology program train to be diesel mechanics that repair diesel-powered trucks and heavy equipment. Students study hydraulics, electrical systems, fuel systems, power trains, air conditioning, brakes and suspension, engine theory, and engine diagnosis, beginning with basic principles and proceeding to an advanced level of system technology. Along with these core courses, students take classes in welding, machining, computers, communications, and math. Credit for independent study is available to those desiring additional instruction in diesel mechanics. Students who complete the program successfully are awarded the Associate of Applied Science degree.

The program often has a waiting list. Prospective students are encouraged to apply one year prior to anticipated school attendance. Contact the Jim Headlee, Program Director, at 406-243-7648 or Jim.Headlee@umontana.edu for more information.

Autumn Entry:

First Year	A	S
DET 120T Electrical Systems	-	8
DET 128T Engine Service I	4	-
DET 135T Power Trains	7	-
CAPP 120 (CRT 100) Introduction to Computers	-	3
M 111 (MAT 110T) Technical Mathematics	-	3
MPR 115T Related Metals Processes	-	3
PSYX 161S (PSY 110S) Fundamentals of Organizational Psychology	3	-
WLDG 101 (WEL 111T) Welding Fund Auto Tech/Diesel	2	-
Total	16	17
Second Year	A	S
DET 221T Brakes, Suspension, and Undercarriage	6	-
DET 225T Hydraulics	6	-
DET 229T Engine Service II	-	7
DET 230T Air Conditioning	-	3
DET 231T Fuel Systems	-	5
DET 235T Advanced Power Trains	-	2
TRK 106T Commercial Driver's License (CDL) Training (offered intermittently)	-	(1)
WLDG 139 (WEL 139T) Welding Maintenance and Repair - Diesel	1	-
WRIT 121 (WTS 115) Introduction to Technical Writing	3	-
Total	16	17-18

Power Generation

(Not available in 2011-2012)

Heavy Equipment Operation-Certificate of Applied Science

The mission of the Heavy Equipment Operation Program is to provide the regional workforce with credentialed, skilled and competent heavy equipment operators and to be responsive to emerging workforce needs. The Heavy Equipment Operation Program provides students a basic understanding of fundamental machine functions and is designed to develop apprentice-level skills in the operation of heavy equipment.

Students are trained to safely and properly operate and maintain a variety of heavy equipment, including crawler-tractors, graders, scrapers, front-end loaders, excavators, backhoes, and dump trucks. Students develop an understanding of basic surveying techniques, receive extensive training in safety regulations and procedures, and learn how to handle controls precisely and judge distances accurately. The program also promotes an awareness of potential job site difficulties and allows students to gain knowledge of the work ethic expected by employers in the construction industry.

A Certificate of Applied Science is awarded after the program is successfully completed.

The program often has a waiting list for admittance. Prospective students are encouraged to apply one year prior to anticipated school attendance. Contact Rod Frost, Program Director, at 406-243-7843 or

Rodney.Frost@umontana.edu for more information.

Autumn Entry	A	S
HEO 140T Basic Surveying	2	-
HEO 146T Safety and Basic Controls	5	-
HEO 148T Operational Skill Building	5	-
HEO 150T Job Simulation	-	6
HEO 151T Service and Maintenance	2	-
HEO 153T Construction Theory and Specialized Equipment	-	5
CAPP 120 (CRT 100) Introduction to Computers	3	-
M 111 (MAT 110T) Technical Mathematics	3	-
MPR 112T Related Metals Processes	-	1
PSYX 163 (PSY 105T) Work Attitudes	-	1
TRK 106T Commercial Truck Driving License Training (offered intermittently)	(1)	-
WRIT 121 (WTS 115) Introduction to Technical Writing or WRIT 095 (WTS 100) developmental Writing	-	3
Total	20-21	16

Recreational Power Equipment-Certificate of Applied Science

The mission of the Recreational Power Equipment Program is to provide the regional workforce with credentialed, skilled, and competent power equipment technicians and to be responsive to emerging workforce needs.

The Recreational Power Equipment Program prepares students to repair and maintain a wide variety of two-cycle and four-cycle engines and related equipment. Students work on motorcycles, ATVs, snowmobiles, outboard motors, and personal watercraft. Units of instruction include mechanical, fuel, and electrical systems. The program also encourages the development of teamwork and interpersonal skills required on the job.

For more detailed information including program costs, tool requirements, student class schedules, and course syllabi, visit: <http://www.cte.umt.edu/industrialtech/rpe/>

Contact Mike Steffenson, Program Director, at 406-243-7693 or Michael.Steffenson@umontana.edu for more information.

Autumn Entry	A	S
SET 160T Basic Electricity	3	-
SET 176T Motorcycle/ATV Engines, Suspension, and Chassis	3	-
SET 177T Motorcycle/ATV Electrical and Fuel Systems	4	-
SET 178T Marine Electrical and Fuel Systems	-	5
SET 179T Marine Powerheads and Lower Units	-	6
SET 180T Snowmobile Maintenance and Repair I	2	-
SET 181T Snowmobile Maintenance and Repair II	-	2
SET 182T Computer Applications for Motor Sports	-	1
CAPP 120 (CRT 100) Introduction to Computers	3	-
M 111 Technical Mathematics	-	3
MPR 115T Related Metals Processes	3	-
PSYX 163 (PSY 105T) Work Attitudes	-	1
WRIT 121 (WTS 115) Technical Writing or WRIT 095 (WTS 100) Developmental Writing	-	3
Total	18	21

Welding Technology - Certificate of Applied Science and A.A.S. Degree

The mission of the Welding Technology Program is to provide the regional workforce with credentialed, skilled, and competent welders and to be responsive to emerging workforce needs. The Welding Technology Program prepares students to operate and troubleshoot a variety of welding power sources and related equipment. The program prepares students to solve problems found within the welding industry using computational skills and other problem-solving techniques essential to welding and steel fabrication. It also encourages the development of teamwork and interpersonal skills required on the job.

Welding students develop skills in six different welding processes—oxyacetylene (OAW), shielded metal arc (SMAW), gas metal arc (GMAW), flux core arc, (FCAW), submerged arc (SAW), and gas tungsten arc welding (GTAW). Beyond the development of welding skills and understanding of the process, they also study other skills, such as blueprint reading and layout, metallurgy, and gain an understanding of how heating and cooling cycles affect the

properties of metals. Students also study the design of jigs and fixtures and how to incorporate these into an automated welding system.

The Welding Technology Program also has courses that provide for a solid background in the metals industry. Such courses are Computer Aided Design and Drafting (CADD), OSHA Rules and Compliance, and Related Metals Processes. Fabrication basics and Metal Design and Construction utilize all of the gained knowledge with an instructor approved/student designed project.

Welding technology students have the opportunity to become certified to American Welding Society Standards and receive documentation stating qualifications.

Students are awarded the Certificate of Applied Science upon successful completion of the first year of the Welding Technology program. Students are awarded the Associate of Applied Science degree upon successfully completing the two-year program.

The program often has a waiting list. Prospective students are encouraged to apply one year prior to their anticipated school attendance. For more detailed information including program costs, tool lists, class schedules, and course syllabi, visit our web site at: www.cte.umt.edu/department/industrial/welding_technology. Contact Mark Raymond, Program Director, at 406-243-7647 or Mark.Raymond@umontana.edu

Autumn Entry:

First Year	A	S
WRIT 121 (WTS 115) Introduction to Technical Writing	-	3
WLDG 117 (WEL 182T) Blueprint Reading & Welding Symbols	-	3
WLDG 145 (WEL 189T) Fabrication Basics	-	4
WLDG 150 (WEL 194T) Welding Layout Techniques	2	
WLDG 180 (WEL 181T) Shielded Metal Arc Welding	4	-
WLDG 184 (WEL 184T) OSHA Rules & Regulations Welding	-	1
WLDG 187 (WEL 185T) Flux Core Arc Welding	-	4
WLDG 191 (WEL 195T) Special Topics	-	(1)
WLDG 205 (WEL 180T) Applied Metallurgy	4	-
CAPP 120 (CRT 100) Introduction to Computers	3	-
M 111 (MAT 110T) Technical Mathematics	3	-
MPR 114T Related Metals Processes	3	-
PSYX 163 (PSY 105T) Work Attitudes	-	1
WRIT 121 (WTS 115) Introduction to Technical Writing	-	3
Total	19	16-17

Successful completion of the courses listed above results in the award of a Certificate of Applied Science in Welding.

Second Year	A	S
WLDG 210 (WEL 282T) Pipe Welding-Integrated Lab	4	-
WLDG 215 (WEL 280T) GTAW (integrated lab)	4	-
WLDG 245 (WEL 281T) Metal Fab Design/Construction	-	4
WLDG 275 (WEL 283T) Gas Metal Arc Welding	-	4
WLDG 280 (WEL 286T) Welding Certification	-	2
WLDG 285 (WEL 285T) Automation in Welding	-	3
BMGT 242T (BUS 242T) Front Line Supervision	-	3
CADX 110 (CRT 182T) Intro to Computer Aided Design	3	-
MPR 214T Advanced Related Metals Processes	3	-
Total	14	16

Courses

U = for undergraduate credit only. R after the credit indicates the course may be repeated for credit to the maximum indicated after the R. Credits beyond this maximum do not count toward a degree.

Building Maintenance (BME)

U 122T Electricity 6 cr. Offered spring. The electrical laws and principles pertaining to DC and AC circuits. Includes current, voltage, resistance, power, load, panels, feeders, lamps, motors, and fuses. Introduction to wiring methods

and materials in conformance with the National Electric Code (NEC). Includes installation and replacement of light fixtures, heaters, GFCI's, switches, receptacles, and electrical thermostats.

U 123T Carpentry 6 cr. Offered autumn. Application of carpentry principles and techniques. Construction and maintenance of foundation, floor, wall, ceiling, and roof systems. Includes safe use of tools and materials common to the industry. Additional topics are painting, masonry, insulation, and ventilation of commercial buildings.

U 127T Low Pressure Boilers 3 cr. Offered spring. The fundamentals of low pressure boiler operation and maintenance. Covers steam, feed-water, fuel, and draft systems. Includes boiler water treatment and hot water heating systems. Introduces safe mechanical operating procedures used in the industry.

U 128T Maintenance 6 cr. Offered autumn. Maintenance principles pertaining to lawns, groundcovers, trees, swimming pools, plumbing, and building cleaning. Emphasis is placed on safe application of chemicals; maintenance frequency; and the identification and safe uses of associated tools and materials.

U 130T Heating and Air Conditioning 6 cr. Offered spring. The fundamentals of heating, ventilating, and air conditioning. Covers heating and refrigeration cycles, gas furnaces, refrigerants, system evacuation and charging, and components used in associated systems. Introduces the basic mechanical service procedures used in the industry.

Carpentry (CSTN)

U 102 (CAR 130T) Concrete Carpentry 4 cr. This course includes advanced blueprint reading, material estimating, site layout, measurement, and differential leveling. Concrete forms are constructed, including continuous, pier, grade beam, slabs, and footings. Form application and construction methods are demonstrated. Cutting, bending, splicing, and tying of reinforcing steel is required. Students learn methods for handling, placing, and finishing concrete. Manufactured forms are introduced for walls, columns, deck slabs, roof slabs, beams, and girders. This course includes a one-credit imbedded lab.

U 120 (CAR 120T) Carpentry Basics & Rough-In Framing 5 cr. Introduction to the carpentry trade, including history, career opportunities, and requirements. The course covers building materials, fasteners, adhesives, hand tools, and power tools. OSHA rules and regulations for a safe working place and procedures for compliance are covered. This course includes a two-credit imbedded lab. Students will also learn how to install windows and an exterior door.

U 122 (CAR 121T) Beginning Carpentry Lab 5 cr. Lab to support CSTN 102 and 120 (CAR 130T and CAR 120T).

U 142 (CAR 140T) Exterior and Interior Finish Carpentry 5 cr. Prereq: CSTN 120 and 122 (CAR 120T & CAR 121T). Study of various types of siding, gutter systems, roof venting requirements, and framing with metal studs. Installation of sheathing, exterior siding, roofing felt, shingles, insulation vapor barriers, and stairs on small building constructed in CSTN 120 (CAR 120T). Installation of wood and metal doors. Demonstration of materials, layout and installation of suspended ceilings. Selection and installation of countertops, base cabinets and wall cabinets. Window, door, floor, ceiling trim and drywall are installed in a small building. This course includes a one-credit imbedded lab.

U 143 (CAR 141T) Intermediate Carpentry Lab 4 cr. Lab to accompany CSTN 142 (CAR 140T). Prereq: CSTN 102, CSTN 120 and CSTN 122 (CAR130T, CAR 120T and CAR 121T).

U 191 (CAR 195T) Special Topics 1-6 cr. (R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 192 (CAR 196T) Independent Study variable cr. (R-6) Offered intermittently

U 205 (CAR 220T) Advanced Carpentry Lecture 6 cr. Prereq: CSTN 102, 120, 122, 142, and 143 (CAR 130T, 120T, 121T, 140T, and 141T). Study of the process for angular measurement, using transits, theodolites, electronic distance measuring devices, lasers, and trigonometric calculating to lay out foundations and determine

elevations. Installation of standing seam, lap seam, and built-up roofing systems; concrete, vinyl, wooden, tile, and carpeted floors as well as radiant heating; paneling, wainscoting, movable partitions, curtain walls and fire-rated commercial wall construction. Advanced stair systems, including shop built and prefabricated stairs, balustrades, mitered risers and treads, and layout of elliptical fastening methods, and assembly techniques. Project planning, scheduling, estimating, and management skills included. This course includes a two-credit lab.

U 206 (CAR 221T) Advanced Carpentry Lab 3 cr. Laboratory to accompany CSTN 205 (CAR 220T). Prereq: CSTN 102, 120, 122, 142, and 143 (CAR 130T, 120T, 121T, 140T, and 141T).

U 261 (CAR 230T) Building Management 4 cr. Prereq: CSTN 102, 120, 122, 142, and 143 (CAR 130T, 120T, 121T, 140T, and 141T). Introduction to building business and project management including overhead costs, payroll costs, estimating and scheduling. Covers elements of payroll computation and preparation, payroll tax returns, information returns, and identification and compensation of independent contractors. Students are introduced to building cost estimating, and scheduling of subcontractors and building inspections. This course includes a one-credit imbedded lab.

U 276 (CAR 236T) Building for Solar Energy 3 cr. Study of the basics of solar energy and design with emphasis on passive solar applications. The elements and design patterns for successful passive solar buildings are covered in detail. Design requirements for solar generated electricity and solar heated water are considered. Also covered are designing new and remodeled buildings to be solar ready, solar retro-fits, and other applications.

U 277 (CAR 240T) Alternative Construction Materials 3 cr. Review of alternative construction materials, as well as building materials using recycled components. Re-use of salvaged materials and use of nontraditional building methods such as straw bale and rammed earth construction will be covered.

U 278 (CAR 241T) Applied Building Practices 6 cr. Offered spring. Prereq., CSTN 102, 103, 120, 122, 142, 143 (CAR 130T, 131T, 120T, 121T, 140T, 141T). Students work on a variety of projects either at the college or in the community to practice and develop their skills as well as learn new skills. Knowing and following OSHA rules and regulations is emphasized. Students are expected to produce a professional quality product.

U 291 (CAR 295T) Special Topics 1-6 cr. (R-6)

U 299 (CAR 231T) Capstone: Carpentry 2 cr. Capstone laboratory to accompany CSTN 102, 120, 122, 142, 143, 205, 206, and 261 (CAR 130T, 120T, 121T, 140T, 141T, 220T, 221T, and 230T). This course provides hands-on experience in which the student applies the skills and knowledge presented in the Carpentry Program. The course will emphasize advanced application in the areas of exterior finishing and interior finishing, and other constructed topics.

Diesel Technology (DET)

U 120T Electrical Systems 8 cr. Offered spring. The theory of AC/DC electricity including Ohm's Law, magnetism, wiring diagrams, and circuit analysis. Starting, charging, and related systems are covered in-depth using test equipment commonly found in heavy equipment repair facilities. Electronic systems are reviewed and tested using common electronic test equipment.

128T Engine Service I 4 cr. Offered autumn. Introduction to the construction and operation of internal combustion engines with the diesel engine being examined in detail. The use of measuring tools and related special tools is covered extensively along with common manufacture rebuild procedures. Start-up and running practices are demonstrated on various running diesel engines. Students must complete this course with a letter grade of "C" or better to enroll in U 135T Power Trains the second-half of the semester.

U 135T Power Trains 7 cr. Offered autumn. Chassis and drive train components used in light and heavy-duty trucks and other equipment. Clutches, manual transmissions, differentials, and final drives are covered.

U 196T Independent Study Variable cr. (R-6) Offered every term.

U 221T Brakes, Suspension, and Undercarriage 6 cr. Offered autumn. Air brake design, construction, and operating principles including an in-depth study of diagnostic procedures for troubleshooting and repairing brake systems. Suspension systems and undercarriage design and repair are covered along with common axle alignment procedures found in industry. Students must complete this course with a letter grade of "C" or better to enroll in U225T Hydraulics in the second-half of the semester.

U 225T Hydraulics 6 cr. Offered autumn. Theory and application of hydraulics relative to mobile construction equipment and industrial hydraulic systems. Includes valves, pumps, motors, actuators, and related hydraulic components, system maintenance, troubleshooting, and repair.

U 229T Engine Service II 7 cr. Offered spring. Prereq., DET 128T. A continuation of Engine Service I with a major emphasis placed on the rebuilding of a diesel engine. Engine components repair and failure analysis are reviewed along with tune-up and running of diesel engines commonly found in the heavy equipment trade. Shop flat-rate procedures, work order procedures, and warranty requirements are covered. Students must complete this course with a letter grade of "C" or better to enroll in U230T Air Conditioning in the second-half of the semester.

U 230T Air Conditioning 3 cr. Offered spring. Prereq., DET 120T, DET 225T. Principles, theories, and the hazards of working with R-12 and R-34, including laws governing these refrigerants. An in-depth study of the components of an air conditioning system including hands-on practice. Discharging and charging principles are discussed, including leakage testing and other general diagnostic principles found in the field.

U 231T Fuel Systems 5 cr. Offered spring. A comprehensive study of diesel fuel injection systems to include: Cummins, Roosa Master, Caterpillar, Detroit Diesel, and Bosch. Disassembly and repair of these systems are covered in-depth along with calibration practices. Installation, timing, and on-engine adjustments are made on diesel engines. On-engine diagnosis of the fuel systems using special diesel engine diagnostic tools is reviewed.

U 235T Advanced Power Trains 2 cr. Offered spring. Prereq., DET 135T. A continuation of DET 135T with an emphasis on heavy automatic transmission, torque converters, and powershift transmission. In-depth coverage of component review troubleshooting and repair.

U 270T Diesel and Gaseous Fueled Engines 3 cr. Offered summer. Prereq., completion of an accredited diesel program or consent of instr. Overview of the diesel engine and its operating principles including the fuel systems found in the power generation field. Both mechanical and electronic type systems studied in depth. Gaseous/spark ignited internal combustion with in-depth look at both the ignition system and fuel system. Emission systems, preventive maintenance and general tune-up included.

U 271T Power Generators 5 cr. Offered summer. Prereq., completion of accredited diesel program and DET 270T. Introduction to generators as found in the power generation field including the review of electrical laws that pertain to A/C and D/C current. The operation of a typical internal combustion powered generator will be covered in depth including troubleshooting and rebuilding practices found in the power generation field. Generator mounting/alignment practices and generator installations, including flow requirements for combustion and cooling.

U 272T Power Generation Controls 4 cr. Offered summer. Prereq., completion of accredited diesel program and DET 271T. Operation of the generator and controls including governing devices and other specialized devices such as reverse power relays and volt/amp reactive power factor (VAR) controllers. Intensive troubleshooting including in depth coverage of service and repair of control systems.

Heavy Equipment Operation (HEO)

U 140T Basic Surveying 2 cr. Offered autumn. Basic principles of surveying and the use of surveying equipment. Calculation of angles and distances to determine grade elevations. Introduction to Global Positioning Systems, lasers and their relationship to the heavy equipment operator.

U 142T Basic Surveying II 1 cr. Offered spring. Prereq., HEO 140T. Students' plan and layout projects undertaken by the program within the community. The students participate in staking and controlling the project by using skills

acquired in HEO 140T. Emphasis is on earthwork surveying.

U 146T Safety and Basic Controls 5 cr. Offered autumn. Orientation to the safe operation and basic control of crawler-tractors, scrapers, front-end loaders, motor graders, backhoes, trucks, and other heavy equipment units. Sufficient time is allowed for the development of basic machine operational skills.

U 148T Operational Skill Building 5 cr. Offered autumn. Prereq., HEO 146T. Advancement of basic skills. Proper understanding and operation of heavy equipment is pursued. Time is allowed for development of proper operational techniques.

U 150T Job Simulation 6 cr. Offered spring. Prereq., HEO 146T, HEO 148T. Incorporates learned skills into entry-level, industrial situations. Emphasis is on advanced equipment usage, problem definition and resolution, project-type earth moving assignments, proper equipment, and safety regulations. Course may allow participation in cooperative project efforts within the community.

U 151T Service and Maintenance 2 cr. Offered autumn. Different types of lubricants and their applications, scheduled and preventive maintenance procedures, and importance of periodic services and maintenance. Also included are safety procedures and regulations.

U 153T Construction Theory and Specialized Equipment 5 cr. Offered spring. Prereq., M 111 (MAT 110T). Study of construction principles, specialized equipment, production estimates, and various related subjects.

Metals Processes (MPR)

U 112T Related Metals Processes 1 cr. Offered spring. Use of hand tools and machines which relate to the repair of heavy equipment. Instruction covers fasteners, layout, bench metal, threads and threading, drills and drilling, and tool sharpening.

U 114T Related Metals Processes 3 cr. Offered autumn. Instruction and use of drills, files, threads and threading processes, basic lathe, drill press, and band saw operation, including precision measuring instruments. Fasteners, layout procedures, and basic hand tools are covered.

U 115T Related Metals Processes 3 cr. Offered autumn and spring. A basic metalworking course covering fasteners, layout, bench metal, heat treating, threads and threading, drills and drilling, basic machining, and tool sharpening.

U 191T Special Topics Variable cr. (R-6). Offered intermittently. Prereq. Consent of instr.

U 196T Independent Study Variable cr. (R-6) Offered intermittently. Prereq., consent of instr.

U 214T Advanced Related Metals Processes 3 cr. Offered autumn. Prereq., MPR 114T or 115T. Advanced skill development using machine tools such as milling machines, lathes, surface grinders, and drill presses, emphasizing safety and providing greater complexity than provided in MPR 114T. Welding and machining are used together demonstrating how sequencing work improves quality and productivity.

Small Engine Technology (SET) (Recreational Power Equipment)

U 160T Basic Electricity 3 cr. Offered autumn. The theory of AC/DC electricity including Ohm's Law, magnetism, series circuits, parallel circuits, the use of meters, and electrical test equipment. Includes electrical symbols, soldering, storage batteries, cranking motors, and electrical safety.

U 176T Motorcycle/ATV Engines, Suspension, and Chassis 3 cr. Offered autumn. Study of the design and function of several types of engines, transmissions, suspension, and brake systems.

U 177T Motorcycle/ATV Electrical and Fuel Systems 4 cr. Offered autumn. Prereq., SET 160T. Principles of ignition, charging, and cranking systems. Design and function of carburetor, fuel injection, and lubrication systems. Hands-on diagnosis of problems and testing of systems.

U 178T Marine Electrical and Fuel Systems 5 cr. Offered spring. Prereq., SET 160T. Theory of and testing and troubleshooting of problems with ignition, charging, and cranking systems. Includes the design, testing, and troubleshooting of marine carburetion and fuel injection systems.

U 179T Marine Powerheads and Lower Units 6 cr. Offered spring. Prereq., SET 178T. Theory of design, function and components of outboard motor powerheads and lower units. Includes basic rigging, power trim and tilt, propping, and personal watercraft design, function, and maintenance.

U 180T Snowmobile Maintenance and Repair I 2 cr. Offered autumn. Prereq., SET 177T. The repair and maintenance of air cooled and liquid cooled engines. Includes clutch, track, and rear suspension service and maintenance.

U 181T Snowmobile Maintenance and Repair II 2 cr. Offered spring. Prereq., SET 180T. Principles and theory of snowmobile electrical, fuel, front suspension, and brake systems.

U 182T Computer Applications for Motorsports Professionals 1 cr. Offered spring. Prereq., CRT 100. Use of recreational power equipment software for parts retrieval, invoicing and payment methods. Students build, query, and create reports using database software, and create a business plan for a hypothetical dealership.

U 195T Special Topics 1-6 cr. (R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 196T Independent Study Variable cr. (R-6) Offered intermittently.

Truck Driving (TRK)

U 106T Commercial Driver's License (CDL) Training 1 cr. Offered intermittently. Prereq., consent of instr. Individual schedule. Truck safety, operation, and maintenance review. Schedule and obtain Class A Commercial Driver's License (CDL).

Welding Technology (WLDG)

U 101 (WEL 111T) Welding Fund Auto Tech/Diesel 2 cr. Offered autumn. Basic and intermediate processes of shielded metal arc welding (SMAW) and oxyacetylene welding are covered in flat, horizontal, and vertical positions in a variety of joint configurations. Instruction in the oxyacetylene cutting process. This course is designed for Diesel students only.

U 103 (WEL 119T) Welding Fund for Construction Trades 2 cr. Offered spring. Basic welding processes of shielded metal arc welding (SMAW), flux core arc welding (FCAW) are covered in the flat, horizontal, and vertical positions in a variety of joint configurations. The instruction in flux core arc welding is focused on the carpentry building trades. Instruction in the oxyacetylene cutting process is also provided. Safe operation of equipment is covered and work is evaluated to industrial standards. This course is designed for carpentry students.

U 117 (WEL 182T) Blueprint Reading and Welding Symbols 3 cr. Offered spring. Prereq., WLDG 150 (WEL 194T) (Practical experience in reading and drawing orthographic projections, interpreting dimensions, notes, scales, and welding symbols. Isometric projection (pictorial), sections, and auxiliary views with practical experience using conventional drafting tools and computer aided drafting (CAD).

U 139 (WEL 139T) Welding Maintenance and Repair Diesel 1 cr. Offered autumn. Prereq., MPR 115T, WLDG 101 (WEL 111T). Combines the skills gained in welding and machine shop for practical applications such as repairing a broken cylinder block. Major emphasis is placed on repair techniques. Common repair procedures using machine shop and welding equipment is demonstrated. This course is designed for Diesel students only.

U 145 (WEL 189T) Fabrication Basics 4 cr. Offered spring. Prereq., MPR 114T; WLDG 180 (WEL 181T); coreq., WLDG 117, 187 (WEL 182T, 185T). Conception, design, and construction of a metal structure to industry standards using shears, presses, and other machine tools common to the welding industry. Skills are developed in the areas of

shielded metal arc welding and flux core arc welding, oxyacetylene cutting, plasma arc cutting, and air carbon arc cutting.

U 150 (WEL 194T) Welding Layout Techniques 2 cr. Using practical layout techniques students develop basics for blueprint construction, layout on pipe and structural steel, and use of tools common to material layout.

U 180 (WEL 181T) Shielded Metal Arc Welding 4 cr. Offered autumn. Theory and safe operation of shielded metal arc welding (SMAW) of carbon steel on plate and structural components in all positions to industry standards. Visual inspection and destructive testing used to determine acceptability based upon industry standards (American Welding Society Structural Welding Code-Steel). Power sources and electrodes are covered in depth. Materials are prepared using mechanical plate shears and thermal cutting techniques. Thermal cutting techniques are examined relative to theory of operation and safe practices. Processes used are oxy-fuel cutting, plasma arc cutting, and air carbon arc cutting. Theory and operation of oxyacetylene welding examined.

U 184 (WEL 184T) OSHA Rules and Regulations Welding 1 cr. Offered spring. Study of the Occupational Safety and Health Administration rules and regulations that affect the welding and construction industries.

U 187 (WEL 185T) Flux Core Arc Welding 4 cr. Offered spring. Prereq., WLDG 180 (WEL 181T) (Theory, practice, and safe operation of flux core arc welding equipment. Coupons are welded in the flat, horizontal, and vertical positions to industry standards using a variety of welding electrodes, diameters, and power sources, which prepare students for welding qualification to the American Welding Society Structural Welding Code specifications.

U 191 (WEL 195T) Special Topics 1-6 cr. (R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 192 (WEL 196T) Independent Study Variable cr. (R-6) Offered intermittently. Prereq., consent of instr.

U 205 (WEL 180T) Applied Metallurgy 4 cr. Offered autumn. Covers the manufacturing of iron and steel. Examination of physical and mechanical properties. Phase changes with the application of heating and cooling cycles. Ferrous crystal types and properties. Suggested welding procedures for low, medium, and high carbon steels, alloy steels, and cast iron.

U 210 (WEL 282T) Pipe Welding-Integrated Lab cr. Offered autumn. Prereq., WLDG 180 (WEL 181T); coreq., WLDG 215 (WEL 280T). Emphasis on skill development in the welding of pipe sections to extremely high quality levels as required by national codes and standards. Pipe welding using GTAW for the root pass and SMAW for the remaining passes in all positions. Visual inspection and destructive testing used to evaluate work according to industry standards.

U 215 (WEL 280T) GTAW (integrated lab) 4 cr. Offered autumn. Prereq., WLDG 180, 187, 210 (WEL 181T, 185T, 282T) The theory and safe operation of Gas Tungsten Arc Welding (GTAW). Examination of power source controls and operation along with associated consumables such as gasses, electrode filler materials for carbon steel, stainless steel, and aluminum. Welding skill development according to industry standards using these materials in the flat, horizontal, and vertical positions.

U 245 (WEL 281T) Metal Fab Design/Construction 4 cr. Offered spring. Prereq., MPR 114T, MPR 214T; WLDG 117, 180, 187, 215, 275. (WEL 181T, 185T, 182T, 280T, 283T). Students combine all knowledge and skills developed in the welding program to design and draw a full set of plans (blueprints) for an instructor-approved project using extensive welding, metal fabrication equipment, machining processes and automation. High quality performance, consistent with business and industry required.

U 275 (WEL 283T) Gas Metal Arc Welding 4 cr. Offered spring. Prereq., WLDG 187 (WEL 185T). Theory and safe operation of Gas Metal Arc Welding (GMAW). Theory of flux core arc welding applied to GMAW. Primary focus on application, practical skill development, and producing welds that meet industry standards. Metals welded are low carbon steel, stainless steel, and aluminum. Short circuit arc and spray arc transfer used. Examination of gas and

electrode selection.

U 280 (WEL 286T) Weld Testing Certification 2 cr. Offered spring. Prereq., WLDG 180, 187, 215, 275 (WEL 181T, 185T, 280T, 283T). Fundamental concepts and requirements of the American Society of Mechanical Engineers (ASME) and American Welding Society (AWS) are examined. Through laboratory experience students are provided the opportunity to qualify (certify) under the two codes mentioned above.

U 285 (WEL 285T) Automation in Welding 3 cr. Offered spring. Prereq., WLDG 117, 150, 187, 215 (WEL 182T, 194T, 185T, 280T), CADX 110 (CRT 182T) Application of the welding process to automation. Examination of simple automation techniques such as tools, clamping, and fixturing to aid in the rapid joining of production runs. Increasing complexity is examined leading into equipment that carries the welding gun, tractors, and carriages by fully automated systems with the student performing set-up and troubleshooting (Submerged Arc Welding) and automated parts processing (optical tracer torch). Programmable controllers are investigated and used. Programming and use of a PUMA 650 Industrial Robot.

U 291 (WEL 295T) Special Topics 1-6 cr. (R-6) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

School of Art

- . Special Degree Requirements
- . Suggested Course of Study
- . Courses
- . Faculty

Julia Galloway, Director

The School of Art provides a comprehensive education in studio art, including intensive hands-on studio practice, art history, criticism, and theory. Programs provide thorough professional training for students interested in careers in the field of art.

Degree offerings include the B.A., B.F.A., M.A., and M.F.A. in Art. Areas of specialization are Ceramics, Drawing, Painting, Photography, Printmaking and Sculpture. An M.A. degree in Studio Art and/or Art History is also offered, as well as courses that prepare students for licensure for teaching art.

Advanced Placement Policy

All students, including those who have taken AP examinations, must submit a portfolio to challenge art classes. Undergraduate students may challenge foundations courses only (ARTZ 105A (Art 101A), Visual Language-Drawing; ARTZ 106A (ART 102A), Visual Language-2-D Fndtns; and ARTZ 108A (ART 103A), Visual Language-3-D Fndtns).

Portfolios are reviewed at the beginning of each semester. The challenge process waives the requirement to take a specific class, but does not provide any credits. The process of portfolio reviews is as follows: students submit a portfolio of ten .jpeg files or pieces of actual work to the school office two weeks prior to the beginning of the semester. If challenging more than one course, students submit examples of work for each course, for example: ten drawing samples for ARTZ 105A (ART 101A), ten color works for ARTZ 106A (ART 102A), and/or ten 3-D pieces for ARTZ 108A (ART 103A).

Transfer Students

Students with transfer credits from another institution must contact the school director for review of transfer transcripts to assess course equivalents.

Special Degree Requirements

Refer to graduation requirements listed previously in the catalog. See index.

Students pursuing Bachelor of Fine Arts or Bachelor of Arts degrees with a major in Art must earn a “C” (2.00 on a 4.00 scale) grade or better in all Art courses fulfilling requirements in order to graduate.

Bachelor of Fine Arts Review Process

All students initially enter as Bachelor of Arts (B.A.) candidates. Students interested in earning the Bachelor of Fine Arts Degree (B.F.A.) must comply with following:

1. Must have and maintain a 3.0 grade point average in Art and a 2.5 overall GPA.
2. Students apply for the B.F.A. program once they have completed 33-45 Art credits. B.F.A. portfolio reviews take place once each semester. A transfer student who enters with more than 45 earned credits must be reviewed the first semester of their residency.
3. The following course selections are review prerequisites: ARTH 200H, 201H (ART 150H, 151H), ARTZ 105A, 106A, 108A (101A, 102A, 103A), four 200-level studio courses, and two 300-level studio courses.
4. Should a student not be admitted to the B.F.A. program in their first application, a second and final application the following semester is encouraged.
5. Applications for the B.F.A. program must include: the application form with the area faculty signature, statement of purpose, and portfolio. Applications are reviewed each semester prior to registration. Incomplete or late applications will not be considered.

Bachelor of Fine Arts with a major in Art

For the Bachelor of Fine Arts degree, areas of specialization are: Ceramics, Drawing, Painting, Photography, Printmaking and Sculpture. This is a professional degree requiring 75 credits in art distributed as follows: art fundamentals, 9; beginning art history, 6; photography, 3; ceramics, 3; printmaking, 3; sculpture, 3; painting, 3; drawing, 3; introductory art criticism, 3; upper-division art history, 6; upper-division art criticism, 3; upper-division studio courses outside area of specialization, 12; upper-division studio courses in the area of specialization, 12; professional practices/senior thesis, 6.

Bachelor of Arts with a major in Art

Students seeking the Bachelor of Arts degree with a major in Art must complete 57 credits in art: art fundamentals, 9; beginning art history, 6; photography, 3; ceramics, 3; printmaking 3; sculpture, 3; painting, 3; drawing, 3; introductory art criticism, 3; upper-division art history, 6; upper-division (300- and 400-level) art studio courses, 12; upper-division art criticism, 3.

Bachelor of Arts with a major in Art, specialization in Art Education

Art education is an area of specialization designed for the student seeking licensure (K-12) in the extended major teaching field of art.

A student must complete ARTZ 105A, 106A, 108A (ART 101A, 102A, 103A), ARTH 200H, 201H, 250L, 350 (150H, 151H, 203L, 215A, 303), ARTZ 211A, 231A, 271A, 251A, 221A, 284A, 402, 403 (ART 223A, 229A, 233A, 235A, 240A, 215A, 407, 408), DANC 497 (DAN 427), twelve credits in upper-division studio courses, and six credits in upper-division art history courses.

For licensure to teach Art K-12, a student must gain admission to Teacher Education Program and meet the requirements for teacher licensure (see the College of Education section of this catalog).

Suggested Course of Study: B.A./B.F.A. Degree.

Credits in parentheses are additional requirements for the B.F.A.

	First Year	F	S
ARTZ 105A (ART 101A) Visual Language - Drawing		3	-
ARTZ 106A (ART 102A) Visual Language - 2-D Fndtns		-	3
ARTZ 108A (ART 103A) Visual Language - 3-D Fndtns		3	-
ARTH 200H-201H (ART 150H-151H) Art of World Civilization I and II		3	3

Two sections of studio class i.e. ARTZ 251A (ART 235) Sculpture I	-	3
and/or ARTZ 271A (ART 233A) Printmaking I	-	3
WRIT 101 (ENEX 101) College Writing I	3	-
Other General Education courses	3	3
	15	15
Second Year		
ARTH 250 L (ART 203L) Introduction to Art Criticism	3	-
ARTZ 211A (ART 223A) Drawing I	3	-
ARTZ 231A (ART 229A) Ceramics I	-	3
ARTZ 284A (ART 215A) Photo I - Techs and Processes	3	-
ARTZ 221A (ART 240A) Painting I	-	3
General Education	6	9
	15	15
Third Year		
Art History (300-level)	3	3
Studio II courses	6	6
Studio courses (B.F.A. option courses)	(3)	(3)
ATH 350 or 450 (ART 303L or 403L) Contemp Art and Art Criticism or Renaissance Theory & Criticism	3	3
General Education	3	6
	15-18	15-18
Fourth Year		
Studio courses (B.F.A., courses in specialization)	(3)	(3)
Studio art courses (300-400 level)	3	3
ARTZ 494 (ART 494) Seminar Professional Practices (B.F.A.)	(3)	-
ARTZ 499 (ART 499) Senior Thesis/Capstone (B.F.A.)	-	(3)
Elective & General Education	6-12	6-12
	15-18	15-18

Requirements for a Minor

Art History/Criticism

To earn a minor in art history/criticism the student must complete at least 24 credits to include the following; ARTZ 105A (ART 101A); ARTH 200H, 201H (ART 150H, 151H), ARTH 250L (ART 203L); 9 credits from 300-level art history courses; 3 credits from ART 303L, or 400-level art history and criticism courses.

Art Studio

To earn a minor in art studio the student must complete at least 27 credits to include the following: ARTZ 105A, 106A, 108A, (ART 101A, 102A, 103A); ARTH 200H, 201H (ART 150H, 151H); 9 credits from ARTZ 284A, 231A, 271A, 251A, 221A, or 211A (ART 215A, 229A, 233A, 235A, 240A, or 223A); and 3 credits in 300-level studio courses.

Courses

U=for undergraduate credit only, UG=for undergraduate or graduate credit, G=for graduate credit. R after the credit indicates the course may be repeated for credit to the maximum indicated after the R. Credits beyond this maximum do not count toward a degree.

Art: Visual Arts (ARTZ)

Studio Courses

U 105A (ART 101A) Visual Language - Drawing 3 cr. Offered autumn and spring. An introduction to visual language, concepts, and studio practicum. Focus on basic skills development in rendering volume, pictorial depth, and figure/ground relationships. Research in historical and contemporary approaches to drawing.

U 106A (ART 102A) Visual Language - 2-D Fndtns 3 cr. Offered autumn and spring. Prereq. or coreq., ARTZ 105A (ART 101A). An introduction to the formal elements and principles of design, color theory, and predominant western and non-western historical styles. Emphasis on solving specific design problems.

U 108A (ART 103A) Visual Language - 3-D Fndtns 3 cr. Offered autumn and spring. Basic three-dimensional course for both general education and beginning art students. Prerequisite to beginning sculpture and beginning ceramics. Emphasis placed on conceptualization and formal development of the 3-D object in the areas of form,

mass, scale, texture, space and color.

U 131A (ART 129A) Ceramics for Non-Majors 3 cr. Offered intermittently. A general introduction to art using ceramics. Less specialized than Ceramics I for art majors. Credit not allowed toward a B.A., B.F.A., or minor in art.

U 191 (ART 195) Special Topics Variable cr. (R-9) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 211A (ART 223) Drawing I: Figure Drawing 3 cr. Offered autumn and spring. Prereq., ARTZ 105A, 108A (ART 101A, 103A) and ARTH 200H or 201H (ART 150H or 151H). Study of human anatomy with an emphasis on rendering and interpreting the figure. Research in historical and contemporary figuration as a basis for developing a portfolio.

U 221A (ART 240) Painting I 3 cr. Offered autumn and spring. Prereq., ARTZ 105A, 106A (ART 101A, 102A), ARTH 200H and 201H (ART 150H and 151H). Acrylic and oil painting emphasizing composition and application of color theory. Research in historical and contemporary strategies.

U 231 (ART 229) Ceramics I 3 cr. Offered autumn and spring. Prereq., ARTZ 108A (ART 103A). Introduction to clay as a historical and contemporary art-making medium. Basic methods of building with clay, with emphasis on handbuilding; elementary solutions to problems of glazing and surface treatment.

U 251A (ART 235) Sculpture I 3 cr. Offered autumn and spring. Prereq., ARTZ 108A (ART 103A). Introduction to fundamental technical skills and new processes in various materials. Further development of the formal concerns within three-dimensional design. Issues of content and formal criticism as it relates to personal expression.

U 271A (ART 233) Printmaking I 3 cr. (R-9) Offered autumn and spring. Prereq., ARTZ 105A (ART 101A). Introduction to various printmaking media.

U 284A (ART 215A) Photography I 3 cr. Offered autumn and spring. Prereq., ARTZ 105A (ART 101A). Introduction to photography as an art form. Exposure, camera basics, composition, developing, printing, print finishing techniques. Focus on technical expertise and issues of content and personal expression.

U 291 (ART 295) Special Topics Variable cr. (R-12) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 311 (ART 323) Drawing II 3 cr. (R-12) Offered autumn and spring. Prereq., ARTZ 105A, 106A (ART 101A, 102A), ARTH 200H, 201H 250L (ART 150H, 151H, 203L), and ARTZ 211A (ART 223A). Exploration and production of drawings with emphasis on individual expression. Studio practicum, lectures, critiques, reading and writing.

U 321 (ART 340) Painting II 3 cr. (R-12) Offered autumn and spring. Prereq., ARTH 200H, 201H, 250L (ART 150H, 151H, 203L), and ARTZ 221A (ART 240A). Continued development of painting skills and concepts development of painting skills and concepts with an emphasis on contemporary ideas, process and materials. Studio practicum, lectures, critiques, reading and writing.

U 331 (ART 329) Ceramics II 3 cr. (R-12) Offered autumn and spring. Prereq., ARTZ 108A and 231A (ART 103A and 229A). Further exploration of the ceramic process introducing more complex ways of handbuilding and developing the art of throwing. Examination of the technology and chemistry of clay, glazes and high temperature oxidation and reduction firing.

U 335 (ART 330) Clay and Glaze 3 cr. Offered autumn. Prereq., ARTZ 108A, 231A (ART 103A, 229A). In-depth study of the physical and chemical properties of clays and glazes. Hands-on testing of various clay and glaze formulas and an introduction to kiln firing.

U 351 (ART 335) Sculpture II 3 cr. (R-12) Offered autumn and spring. Prereq., ARTZ 108A or 251A (ART 103A or 235A). Focus on contemporary issues and a deeper engagement with materials. Development and execution of

clear sculptural responses to material-based and topic-based assignments.

U 371 (ART 333) Printmaking II 3 cr. (R-12) Offered autumn and spring. Prereq., ARTZ 271A (ART 233A). Continued work in various printmaking media.

U 384 (ART 315) Photo II - Theory, Criticism, Practice 3 cr. (R-12) Offered autumn and spring. Prereq., ARTZ 105A, 284A (ART 101A, 215A). Further exploration of photography as an art form. Survey of different approaches to cameras, films, chemical and digital processes, presentation techniques. Emphasis on issues of content and personal expression.

U 385 (ART 317) The Art of Digital Photography 3 cr. Offered autumn or spring. Prereq., ARTZ 105A, 284A (ART 101A, 215A). Introduction to digital photographic manipulation. Survey of techniques, theory and potential for creative expression as an art form.

U 388 (ART 318) Alternative Process Photography 3 cr. Offered intermittently. Prereq., ARTZ 105A, 284A (ART 101A, 215A). Introduction to historic, experimental and alternative process photography. Survey of techniques, theory and potential for creative expression as an art form.

U 391 (ART 395) Special Topics Variable cr. (R-12) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

U 394A (ART 324A) Seminar-Environmental Drawing 3 cr. Offered Spring. A drawing seminar specifically designed for the Wilderness and Civilization program. Students will explore and develop individual ideas with various media based on the curriculum of the Wilderness Program.

U 398 (ART 390) Internship Variable cr. (R-12) Offered autumn and spring. Special internships under direction of department faculty allowing students practical experience in a chosen area.

UG 410 (ART 424) Advanced Research - Drawing 3 cr. (R-9) Offered intermittently. Prereq., ARTZ 311 (ART 323) and consent of instructor. Investigation of drawing with emphasis on student proposals, including specific technical and conceptual aspects.

UG 420 (ART 442) Advanced Research - Painting 3 cr. (R-9) Offered intermittently. Prereqs., ARTZ 105A, 106A (ART 101A, 102A), ARTH 200H, 201H, 250L (ART 150H, 151H, 203L), ARTZ 211A, 221A, 311, 321, and 422 (ART 223A, 240A, 323, 340, and 341) and/or consent of instructor. Investigation of painting with emphasis on student proposals, including specific technical and conceptual aspects.

U 422 (ART 341) Painting II 3 cr. (R-9) Offered autumn and spring. Prereq., ARTH 200H, 201H, 250L (ART 150H, 151H, 203L), and ARTZ 321 (ART 340). Includes ARTZ 422 (ART 341): Process and Abstraction and ARTZ 422 (ART 341): Portfolio Development. Studio and ARTZ 422 (ART 341): Finding Language. Exploration and production of paintings with emphasis on individual expression. Studio practicum, lectures, critiques, reading and writing.

UG 430 (ART 430) Advanced Research - Ceramics 3 cr. (R-9) Offered intermittently. Investigation of ceramics with emphasis on student proposals, including specific technical and conceptual aspects.

UG 470 (ART 434) Advanced Research - Printmaking 3 cr. (R-9) Offered intermittently. Investigation of printmaking with emphasis on student proposals, including specific technical and conceptual aspects.

UG 484 (ART 414) Photography III - Studio Projects 3 cr. (R-9) Offered autumn or spring. Prereq., ARTZ 105A, 284A, 384 (ART 101A, 215A, 315). Further exploration of photographic theory, criticism, technique and expression as an art form.

UG 486 (ART 416) Advanced Research - Photography 3 cr. (R-9) Offered intermittently. Pre-req., consent of instructor. Investigation of photography with emphasis on student proposals, including specific technical and conceptual aspects.

UG 491 (ART 495) Special Topics Variable cr. (R-12) Offered intermittently. Experimental offerings of visiting professors, experimental offerings of new courses, or one-time offerings of current topics.

UG 492 (ART 415/423/427/429/433/435/440) Independent Study 2-6 cr. (R-24) Offered intermittently. Prereq. Consent of instructor. Advanced studio techniques with emphasis on student initiated projects.

UG 494 (ART 494) Seminar - Professional Practices 3 cr. Offered autumn. Prereq., senior or graduate status. Required of all graduating B.F.A. students. Introduction to professional practices and standards in the visual arts, including presentation, portfolio development, career and exhibition opportunities, arts advocacy and graduate school.

UG 498 (ART 490) Internship Variable cr. (R-12) Offered intermittently. Prereq., consent of instructor. Special internships under direction of department faculty allowing students practical experience in a chosen area.

U 499 (ART 499) Senior Thesis/Capstone 3 cr. Offered spring. Prereq., senior status, ARTZ 494 (ART 494), and successful passage of B.F.A. review. Required of B.F.A. students. Focus on completion of artwork and preparation for the required spring B.F.A. exhibition. Further exploration of professional practices topics and career opportunities.

G 501 (ART 501) Graduate Critique Seminar 2 cr. (R-4) Offered autumn and spring. Prereq., consent of instructor. Weekly meetings to critique graduate student work.

G 502 (ART 502) Graduate Assistant Seminar/Professional Development 2 cr. Offered autumn. Prereq., Graduate student status. A seminar-based course emphasizing various approaches to teaching, along with professional practices in art.

G 504 (ART 504) Pre-Candidacy 1 cr. Offered autumn and spring. Prereq., consent of instructor. Graduate Standing concurrent with Art 500-level Graduate Research and Studio Processes. Course emphasizes one-on-one instruction with faculty from the student's area of concentration in preparation for the student's all-faculty review prior to thesis work.

G 505 (ART 505) Graduate Studio Research: ART 3-6 cr. (R-6) Offered autumn and spring. Graduate program. Students meet during regularly scheduled times with faculty or in small groups throughout the semester to discuss the development of their individual work.

G 511 (ART 523) Graduate Research/Studio Processes: Drawing 2-6 cr. (R-24) Offered autumn and spring. Prereq., consent of instructor. Advanced research in drawing.

G 515 (ART 584) Graduate Research/Studio Processes: Photography 2-6 cr. (R-24) Offered autumn and spring. Prereq., consent of instructor. Advanced research in photography.

G 521 (ART 540) Graduate Research/Studio Processes: Painting 2-6 cr. (R-24) Offered autumn and spring. Prereq., consent of instructor. Advanced research in painting.

G 531 (ART 529) Graduate Research/Studio Processes: Ceramics 2-6 cr. (R-24) Offered autumn and spring. Prereq. consent of instructor. Advanced research in ceramics.

G 551 (ART 535) Graduate Research/Studio Processes: Sculpture 2-6 cr. (R-24) Offered autumn and spring. Prereq., consent of instructor. Advanced research in sculpture.

G 571 (ART 533) Graduate Research/Studio Processes: Print 2-6 cr. (R-24) Offered autumn and spring. Prereq., consent of instr. Advanced research in printmaking.

G 594 (ART 594) Seminar Variable cr. (R-6) Offered intermittently.

G 595 (ART 595) Special Topics Variable cr. (R-12) Offered intermittently. Experimental offerings of visiting