West Virginia University Institute of Technology

A Short History of WVU Tech

The West Virginia University Institute of Technology (WVU Tech) was established in February 1895 under the name, Montgomery Preparatory School located in Montgomery, WV. In its earliest years, the school provided academic preparation for students from Southern West Virginia who were bound for West Virginia University. With the passing of time, as new community needs emerged the school changed in response to these needs. In 1917, the curriculum became vocational in nature and the school was renamed the West Virginia Trade School. In 1921, the school became a junior college, the New River State School. Ten years later, the school name was changed to New River State College reflecting its mandate to provide baccalaureate education. Then, in 1941, when technical and business programs were added to serve regional businesses and industries, the college became the West Virginia Institute of Technology. In 1952, baccalaureate degrees in engineering were added. In 1996, the college was named West Virginia University Institute of Technology, when it became a regional campus of West Virginia University. Subsequently, in 2006, WVU Tech became a full division of West Virginia University. In Fall 2016, following the acquisition of a campus in Beckley, WV, WVU Tech offered classes on both the Montgomery and Beckley campuses for one academic year. WVU Tech moved in its entirety to Beckley in the summer of 2017. WVU Tech offers a broad array of baccalaureate degrees in business, science, the humanities and social sciences, and offers 9 degrees in engineering, computer science and engineering technology that are ABET accredited and have received national rankings. Degrees include a general education curriculum that fosters educational breadth and career skills, and students engage in a wide range of service learning, athletic and extra-curricular activities. A WVU Nursing degree is offered on the Beckley Campus through WVU Tech, and the campus is also home to the Raleigh County Co-operative Extension Service and the LaunchLab to promote regional economic success.

Location

BECKLEY CAMPUS

WVU Tech (Beckley Campus) is located in Beckley, West Virginia. Situated in scenic Raleigh County in southern West Virginia, Beckley has a population of about 17,500. Beckley is a vibrant and growing community in close proximity to many of West Virginia's wild and wonderful outdoor recreation areas.

Major U.S. highways serving the Beckley campus of WVU Tech include Interstate Routes 64 and 77 and the US Route 19, a four lane highway. Within 11 miles of Beckley is Amtrak's Prince Station. Air services are provided through Yeager Airport in Charleston, WV or Beckley Raleigh County Memorial Airport.

Within sixty minutes of both the Montgomery and Beckley campuses are some of the best “wild and wonderful” recreational opportunities in the eastern United States. Hawks Nest State Park, with its aerial tram to the bottom of the New River Canyon, is within 20 miles. Thirty miles away is the New River Gorge Bridge, the longest arch bridge east of the Mississippi River and third longest in the world, that plays host to the extreme adventure event, Bridge Day. Other nearby parks, Kanawha State Forest, Coonskin Park, Babcock State Park, Summersville Lake and Stephen’s Lake, are between one and two hours away and afford abundant opportunities to picnic, swim, boat, and fish. Adventure enthusiasts have next-door access to such highly desirable sports as zip lining, whitewater rafting, rock climbing, hiking, mountain biking, off-road riding and driving, Frisbee Golf and the exhilarating winter sports of snowboarding, snowshoeing, snow tubing, and alpine, cross-country, and downhill skiing. Adjacent to Beckley is the Summit Bechtel Reserve, national high adventure base of the Boy Scouts and host to national and international jamborees.

Tech Golden Bear Alumni Association

The goals of the Tech Golden Bear Alumni Association are twofold: to promote the interests of the University and to establish mutually beneficial relationships between the University, its alumni, and other appropriate constituent groups. All former students who completed academic courses at New River State College, West Virginia Institute of Technology, the Community and Technical College of West Virginia Institute of Technology and West Virginia University Institute of Technology qualify for active membership. Members of the faculty, both current and emeritus, hold honorary memberships, and friends of the University may be named to associate membership. Details about the Tech Golden Bear Alumni Association are available online at http://alumni.wvutech.edu/, by email at tech-alumni@mail.wvu.edu, by telephone at 304.929.1254, or by writing WVU Tech Alumni Relations, 410 Neville Street, Beckley, WV 25801.

Disclaimer

This West Virginia University Institute of Technology (WVU Tech) 2017-2018 College Catalog is intended as a general reference on degree programs and their requirements, course offerings, admission, graduation requirements, and other academic rules and regulations of the institution. WVU Tech reserves the right to change, delete, supplement, or otherwise amend the contents of this catalog as necessary without prior notice. The operations of this institution are subject to continuing review and change. WVU Tech is governed by to the West Virginia University Board of Governors. Many policies and rules in this catalog are identical to those for West Virginia University or may be represented on West Virginia University websites. However, other language in this catalog is unique to WVU Tech, so that WVU language should not be employed in all cases. West Virginia University language is not applicable to WVU Tech in all cases.
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MISSION

West Virginia University Institute of Technology provides an accessible and supportive environment in which students are guided to be active and contributing members of society by fostering intellectual and personal growth through comprehensive educational experiences.

VISION

To be a nationally-recognized and preeminent regional undergraduate STEM (Science, Technology, Engineering, and Mathematics) teaching institution with well-balanced curricula across diverse academic disciplines.

GOALS AND OBJECTIVES

Goal 1: Engage undergraduate students in a challenging academic environment.

Objectives

1. Educate, retain, and graduate the leaders of tomorrow at the undergraduate level.
2. Encourage innovation in teaching and, through assessment of outcomes and objectives, transform the curriculum to provide students with the skills they need to succeed in a rapidly changing global society.
3. Strengthen relationships with state and regional primary and secondary education systems, as well as community and technical colleges, to facilitate a seamless, life-long learning process.

Goal 2: Excel in scholarly activity, professional development, and innovation throughout the institution.

Objectives

1. Increase scholarly activity addressing challenges faced by West Virginia, the nation, and the world.
2. Strengthen interdisciplinary activity in scholarship, professional development, and creativity.
3. Encourage interdisciplinary activity in scholarship, professional development, and creativity.

Goal 3: Maintain and strengthen an environment that promotes, attracts, supports, and includes diverse groups of students, faculty and staff.

Objectives

1. Incorporate diversity broadly into the curriculum.
2. Facilitate intercultural, intercommunity, and campus-wide outreach.

Goal 4: Advance national awareness, international activity, and global engagement.

Objectives

1. Promote international activity, world-wide engagement, and awareness of national and global issues.
2. Integrate global themes broadly into the curriculum.

Goal 5: Enhance the well-being and the quality of life of the people of West Virginia.

Objectives

1. Promote sustainable economic development and a cultural environment that improve the quality of life throughout the state.
2. Increase opportunities for West Virginians through life-long learning and community outreach.
RESEARCH AND SCHOLARSHIP

As West Virginia’s flagship research institution, WVU undertakes scholarly activity that addresses the challenges most critical to today’s world and the practice of multidisciplinary research. At WVU Tech, a division campus where the educational mission is of paramount importance, faculty pursue an active agenda of research and scholarship which contributes to the vibrancy of their teaching and current knowledge in their fields.

WELL-BEING AND QUALITY OF LIFE

The Smith-Lever Act of 1914 created a Cooperative Extension Service for each land-grant institution. The purpose of the Extension Service was to disseminate the findings of the universities’ agricultural stations and provide training and programs on home economics and other practical subjects. WVU has sustained its commitment to the state by supporting an Extension Service office with a faculty presence in all of West Virginia’s 55 counties, staffed by faculty county agents.

The educational programs and initiatives of the WVU Extension Service focus on service to the state and exemplify West Virginia University’s commitment to the public good by connecting the knowledge and research of WVU with citizen and community needs. The Extension Service’s programs are driven by four major initiatives: (1) 4-H youth development; (2) family and health; (3) agriculture and natural resources; and (4) community, workforce, and economic development.

The Raleigh County Extension office is located in the Neville Street Building on the WVU Tech campus in Beckley.

SOCIAL JUSTICE AND MEDIATION OF CONFLICT

WVU Tech is committed to assuring that all individuals and groups have access to all of the benefits of the University. Such assurance is possible only in an atmosphere of mutual respect and trust, where basic concepts and principles of social justice are integral to daily practice. All groups on campus (students, faculty, staff, administrators, and constituent groups) have the legal and moral responsibility to promote opportunity, equality, civility, and respect for all peoples. WVU Tech is also committed to assuring the resolution of conflict through mediation, a structured process of communication in which conflicting parties are guided in discussion and resolution of matters of conflict. Information and assistance with filing a complaint or obtaining mediation services is available online at http://diversity.wvu.edu/ea/mediation-services/mediation or by telephone at 304.293.5600, by email at diversity@mail.wvu.edu, or by writing the Division of Diversity, Equity and Inclusion, West Virginia University, PO Box 6202, Morgantown, WV 26506-6202.

ACCESSIBILITY SERVICES

WVU Tech partners with WVU’s Office of Accessibility Services (http://accessibilityservices.wvu.edu) which is dedicated to helping students achieve their academic goals regardless of any physical, learning, psychological, sensory, or other documented disability. West Virginia University’s process for providing disability-related accommodations follows guidelines of the Americans with Disabilities Act, Section 504 of the Rehabilitation Act of 1973, and current case law.

Accreditation

West Virginia University Institute of Technology is accredited by The Higher Learning Commission as a division of West Virginia University. West Virginia University is a member of the North Central Association of Colleges and Schools. Information regarding affiliation status may be directed to North Central Association of Colleges and Schools, Higher Learning Commission, 30 North LaSalle Street, Suite 2400, Chicago, Illinois 60652-2504.

Information Regarding specialized program accreditation may be directed to the following accrediting agencies:


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Governor of West Virginia

• Jim Justice, Governor
West Virginia University Board of Governors

- William D. Wilmoth, Chair, Wheeling
- David B. Alvarez, Vice Chair, Bridgeport
- Taunja Willis Miller, Secretary, Morgantown
- Timothy Bailey, Hurricane
- Elmer Coppoolse, Lewisburg
- Thomas V. Flaherty, Charleston
- Thomas A. Heywood, Charleston
- Dr. Stanley Hileman, Faculty Representative, Morgantown
- Blake Humphrey, Student Representative, Wheeling
- J. Thomas Jones, Morgantown
- Dixie Martinelli, Classified Staff Representative, Morgantown
- Edward L. Robinson, Charleston
- J. Robert "JR" Rogers, Hurricane
- Benjamin M. Statler, Pittsburgh
- Dr. Matthew C. Valenti, Faculty Representative, Morgantown
- Kimberly Weaver, Baltimore, MD

The West Virginia University Board of Governors (the "Board") was created by the West Virginia Legislature as the governing body of the West Virginia University system, including West Virginia University, West Virginia University Potomac State College, and West Virginia University Institute of Technology (collectively the "University"). The Board has the mission of general supervision and control over the academic and business affairs of the University.

West Virginia University is an Equal Opportunity/Affirmative Action Institution. The University does not discriminate on the basis of race, sex, age, disability, protected veteran status, religion, sexual orientation, color, national origin, or other class protected by the University's non-discrimination policy (BOG Policy 44 (http://catalog.wvu.edu/undergraduate/Policy_44_-_December_18_2015_Amendment.pdf)) in the administration of any of its educational programs or activities or with respect to admission or employment. Further, faculty, staff, students, and applicants are protected from retaliation for filing complaints or assisting in an investigation under the University's Equal Opportunity/Affirmative Action Plan. Inquiries regarding the University's non-discrimination policy may be sent to the Office of Diversity, Equity, and Inclusion.

West Virginia University Administration

- E. Gordon Gee, President
- Joyce McConnell, Provost and Vice President for Academic Affairs

West Virginia University Institute of Technology Administration

- Carolyn Long, Campus President (provides leadership for WVU Tech as a divisional campus of WVU)
- Nigel Clark, Campus Provost

Deans

- College of Business, Humanities, and Social Sciences, Stephen Brown
- Leonard C. Nelson College of Engineering and Sciences, Zeljko Torbica
- Department of Nursing, Crystal Sheaves

Effective July 1, 2001, the West Virginia University (WVU) Board of Governors is vested by law and with the authority for the control and management of WVU and the divisional campuses. The board includes thirteen lay members, two faculty members, a staff member, and one student member. The University president, appointed by the Board of Governors, is the chief executive officer of the University. A Campus President provides leadership for WVU Tech as a divisional campus of the University. The Chair of the WVU Tech Board of Visitors, an advisory body, is a member of the WVU Board of Governors.

The WVU Faculty Senate is the vehicle for faculty participation in the governance of West Virginia University and its divisional campuses, including WVU Tech. It is a legislative body with original jurisdiction over all matters of academic interest and educational policy that concern the entire University or affect more than one college or school. The senate's decisions are subject to review and approval by the president and the Board of Governors. Senators are elected by members of the University faculty to represent their colleges and other constituencies. Each senator represents twenty members of the University Faculty. The senate is presided over by an elected chair. The WVU Faculty Senate includes senators who are elected by the faculty at WVU Tech. On the WVU Tech campus, the faculty are represented by the Faculty Assembly. This body is made up of all full-time faculty, including visiting appointments, as well as those with FEAP appointments. The Faculty Assembly is presided over by an elected chair.
The Staff Council is an advisory council to the Campus President, and provides a means for all classified employees to express their opinions about employment conditions, fringe benefits, employee relations, or other areas that affect their careers.

Students are represented by the Student Government Association, which is made of executive officers and representatives elected by the student body. Members of the SGA serve on various campus committees.

**2017-2018 Academic Calendar**

Please visit [http://techregistrar.wvutech.edu/academic-calendar](http://techregistrar.wvutech.edu/academic-calendar) for more information.

**ACCOUNTING**

**ACCT 201. Principles of Accounting. 3 Hours.**
The concepts, principles, and procedures pertaining to the preparation, analysis, and interpretation of financial statements.

**ACCT 202. Principles of Accounting. 3 Hours.**
PR: ACCT 201 with grade of C or better. Utilization of accounting information for purposes of managerial control and decision making; cost concepts, profit and financial budgeting, analysis of financial statements.

**ACCT 311. Intermediate Accounting. 3 Hours.**
PR: WVU sections require ACCT 201 and ACCT 202 with a grade of B- or better in each and PR or CONC: ACCT 321, WVUIT sections require ACCT 201 and ACCT 202 with a grade of C- or better. Development of accounting theory and practice, with emphasis on asset accounting.

**ACCT 312. Intermediate Accounting. 3 Hours.**
PR: ACCT 311 with a grade of C- or better. Theory and practice with respect to accounting for liabilities and stockholders equity; special problems peculiar to financial accounting; analysis of financial statements and changes in financial position.

**ACCT 322. Accounting Systems. 3 Hours.**
PR: ACCT 321 and BCOR 330 with a minimum grade of C- in each. Analysis of data processing fundamentals and information systems analysis, design, and implementation, including necessary computer hardware and software components with particular reference to accounting information systems and the controls necessary therein.

**ACCT 331. Managerial Accounting. 3 Hours.**
PR: ACCT 202 with a minimum grade of C-. This course is intended for non-accounting majors. Analysis of internal accounting practices with emphasis on use of data for performance evaluation, control, motivation, through accounting systems, and decision-making. (No credit available to students having credit for ACCT 431 and ACCT 432.)

**ACCT 348. Financial Statement Analysis. 3 Hours.**
PR: ACCT 201. This course will include an in-depth review of financial statements; financial ratios and fraud analysis; industry average comparisons; financial services and library sources; and extended utility of ratios. Also listed as FIN 328.

**ACCT 415. Advanced Accounting. 3 Hours.**
PR: ACCT 312 and (ACCT 321 or ACCT 323). Accounting for business combinations, consolidations, foreign currency translation, governmental and nonprofit entities, and equity method investment accounting.

**ACCT 420. Fraud Examination. 3 Hours.**
PR: ACCT 201. An overview of fraud related concepts; management fraud; financial statement fraud; fraud prevention and detection techniques; elements of fraud investigation; and interviewing process.

**ACCT 421. Fraud Management: Legal/Ethical Issues. 3 Hours.**
Offers a basic understanding of what motivates criminals to commit fraud; legal elements of fraud; rules of evidence; key legal rights and privacy issues; testifying; and non-control deterrence and methods used to implement it.

**ACCT 422. Advanced Fraud Investigation & Analysis. 3 Hours.**
This course includes an in-depth review of techniques used in investigating financial fraud. Topics include: investigating theft and concealment; sources of information; interviewing and testifying.

**ACCT 423. Information Security and Controls. 3 Hours.**
This course will cover security issues in a computerized environment. Topics include: security guidelines, implementation, and cost issues; risk management and control.

**ACCT 432. Advanced Cost Management. 3 Hours.**
PR: ACCT 202 or department consent. Advanced cost management concepts and techniques with emphasis on cost measurement systems and the evaluation and management of performance.

**ACCT 441. Income Tax Accounting 1. 3 Hours.**
PR: ACCT 311 with a minimum grade of C-. Federal income taxation of individuals emphasizing filing status, exemptions, gross income, deductions, credits, compensation, retirement savings, home ownership, property transactions, and investments.

**ACCT 442. Income Tax Accounting 2. 3 Hours.**
PR: ACCT 441. Federal income tax treatment of corporations, pass through entities and their owners or beneficiaries, introduction to transfer taxes and planning.
ACCT 449. Case Studies in Fraud Examination and Management. 3 Hours.
PR: ACCT 422. This capstone course integrates the knowledge and skills acquired during the fraud-related course work in the program. Several cases will be assigned for discussion and written analysis. Students will also be required to write a research paper.

ACCT 450. Accounting Technology. 3 Hours.
PR: ACCT 322 or ACCT 323. Survey and application of computerized accounting software systems set up, general ledger, accounts receivable, accounts payable, payroll, and preparation of financial statements.

ACCT 451. Auditing Theory. 3 Hours.
PR: ACCT 312 and (ACCT 322 or ACCT 323). Standards and procedures related to the independent audit of financial statements.

ACCT 461. Accounting for Nonbusiness Entities. 3 Hours.
PR: ACCT 312 and (ACCT 321 or ACCT 323). Accounting, reporting, and budgeting for governmental and nonprofit entities and the use of fund accounting data for planning and control.

ACCT 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

ACCT 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses. (Maximum of nine semester hours in any or all courses numbered 493 offered by the College of Business and Economics may be applied toward bachelor's and master's degree.)

ADVENTURE RECREATION

ADRC 101. Essential Skills in Adventure Recreation. 3 Hours.
This course focuses on foundational outdoor skills needed to safely participate in and lead trips in outdoor settings. Students learn and practice equipment selection and use, outdoor cooking, map compass navigation and wilderness first aid in classroom and outdoor settings.

ADRC 102. Adventure in Society. 3 Hours.
This course explores how outdoor adventure has transformed from a daily necessity for survival in early cultures to its modern form of recreational pursuit. Through readings, media, lectures and hands-on adventure experiences students explore historical and modern perspectives of popular adventure pursuits and their societal influence.

ADRC 103. Introduction to Adventure Recreation. 3 Hours.
Overview of the adventure recreation industry including adventure tourism, instruction, guiding, sports and therapeutic applications. Examines motivations and trends of participation and professional employment opportunities in the field.

ADRC 111. Introduction to Whitewater Rafting. 1 Hour.
Introductory skills course in navigating class II-III whitewater in inflatable watercraft. Content includes equipment selection and care, river features and hazards, paddle strokes, steering, whitewater maneuvers and basic rescue techniques. Must meet essential eligibility requirements to participate.

ADRC 112. Whitewater Rafting Techniques. 1 Hour.
PR: ADRC 111 or permission of the instructor. Whitewater raft skill development course designed to build intermediate skills on class III-IV whitewater. Includes intermediate paddle raft maneuvers, oar-rig operation and self-recovery techniques. Must meet essential eligibility requirements to participate.

ADRC 121. Introduction to Rock Climbing. 1 Hour.
Introduction to rock climbing skills. Content includes skills necessary to climb and belay using a top-rope system both on artificial and natural climbing surfaces. Must meet essential eligibility requirements to participate.

ADRC 122. Rock Climbing Techniques. 1 Hour.
PR: ADRC 121 or permission of the instructor. Rock climbing skill development course focused on building proficiency for independent set-up and safe climbing practices in a top rope climbing setting. Must meet essential eligibility requirements to participate.

ADRC 131. Introduction to Mountain Biking. 1 Hour.
Introduction to mountain biking and riding techniques. Foundational content and practice on biking skills, etiquette, and technical knowledge. Must meet essential eligibility requirements to participate.

ADRC 201. Leadership in Adventure Recreation. 3 Hours.
PR: ADRC 101 and ADRC 103 or the permission of the instructor. Introduction to skills and techniques for leading small groups in outdoor settings. Content focused on program design, teaching techniques, guiding principles, group development and risk management.

ADRC 211. Introduction to Whitewater Raft Guiding. 1 Hour.
PR: ADRC 112 or permission of the instructor. Introduces methods and skills of commercial raft guiding on class III-IV whitewater. Emphasis is placed on customer care, building a short-term paddling team, effective communication and group safety. Must meet essential eligibility requirements to participate.

ADRC 212. Swiftwater Rescue. 1 Hour.
PR: ADRC 111 or permission of the instructor. Introductory theory and skills in self and group rescue techniques of paddlers in swiftwater settings. Instruction emphasizes recognition and avoidance of common river hazards, personal/group safety, throw bag use, rope/boat/wading-based rescues, rescue PFD use and mechanical advantage systems. Must meet essential eligibility requirements to participate.
ADRC 221. Lead Climbing. 1 Hour.
PR: ADRC 122 or permission of the instructor. Introduces experienced top rope climbers to techniques and skills required to lead climb bolted sport and traditional lead routes. Emphasis on safety practices, equipment, lead climbing knots, lead belay technique, bolt assessment, route finding, traditional gear placement and anchor cleaning. Must meet essential eligibility requirements to participate. Must have the ability to climb 5.8 on a top rope.

ADRC 222. Climbing Rescue Techniques. 1 Hour.
PR: ADRC 122 or permission of the instructor. Introduces theory and skills in self and group rescue for climbers in high angle terrain. Content includes vertical rescue management, belay escapes, ascending ropes, mechanical advantage systems, lowering systems, rescue rappels and counter-balance systems. Must meet essential eligibility requirements to participate.

ADRC 293. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ADRC 301. Adventure Recreation Program Management. 3 Hours.
PR: ADRC 103. Builds student knowledge and competency in the management of an adventure recreation enterprise. Emphasis is given to programmatic design, risk management, budgeting, staffing and support operations.

ADRC 302. Adventure Travel and Tourism. 3 Hours.
PR: ADRC 103 and PR or CONC: ADRC 301. Overview of the adventure travel industry from the perspective of consumer, provider and promoter. Emphasis given to market analysis, destination planning and business operations of adventure-based tourism products.

ADRC 311. Whitewater Raft Trip Leadership. 1 Hour.
PR: ADRC 211 or permission of the instructor. Advanced skill course focused on methods and skills needed to lead whitewater paddling day trips primarily in rafts. Hands-on activities focus on site selection, equipment, logistics, permits, risk management, on-river trip management and group safety. Must meet essential eligibility requirements to participate.

ADRC 321. Rock Climbing Instructor Development. 1 Hour.
PR: ADRC 221 and must meet essential eligibility requirements to participate plus also have at least one year of personal climbing experience or permission of the instructor. Advanced skill course focused on development of instructional skills in rock climbing. Hands-on activities emphasize climbing site selection, risk management, technical skills as well as key instructional skills. Rock Climbing resume must show more than 20 single pitch traditional gear protected leads over 5.6 difficulty and can comfortably climb 5.8 routes on top rope at time of course.

ADRC 401. Ethical and Legal Issues in Adventure Programming. 3 Hours.
PR: ADRC 301. Examination of ethical and legal issues faced by program managers and field leaders in the development, administration and operation of adventure activities.

ADRC 491. Professional Field Experience. 1-18 Hours.
(May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

ART HISTORY
ARHS 101. Landmarks of World Art. 3 Hours.
Introduction to the study of art history from prehistory to the present in which major landmarks of world art and architecture are considered as aesthetic objects, cultural documents and within their socio-historical contexts.

ATHLETIC COACHING EDUCATION
ACE 105. Nutrition for Coaches. 3 Hours.
General nutrition and dietary requirements to aid coaches and their athletes.

ACE 106. Athletic Coaching Education. 3 Hours.
Overview of athletic coaching profession including careers opportunities, critical current issues/trends, professional standards and the professional organizations.

ACE 168. Sport Officiating. 2 Hours.
Study of the art, science, industry standards, and best practices of the officiating profession across all levels of sport.

ACE 256. Principles and Problems of Coaching. 3 Hours.
Designed to teach students the principles and problems of interscholastic athletic coaching.

ACE 265. Diversity and Sport. 3 Hours.
Covers historical and current topics relevant to diversity in sport as it relates to current sport practices. Practical strategies for facilitating acceptance of diversity within individual/team sports are discussed.

ACE 315. Sport for Exceptional Athlete. 3 Hours.
Examines the past, present and future of sport for athletes with disabilities and those competing at the Masters-level. The focus is on the coaching of these unique populations of competitive and recreational athletes.

ACE 330. Coaching Education Administration. 3 Hours.
An administrative focus of leadership, finance, fundraising, planning, facility development, personnel supervision, public relations, rules and regulations, purchase and care of equipment and the conducting of athletic events.
ACE 361. Techniques of Coaching: Soccer. 2 Hours.
Designed to permit students to gain athletic coaching experience through a supervised on-site experience with a varsity athletic team.

ACE 362. Techniques of Coaching: Basketball. 2 Hours.
Designed to permit students to gain athletic coaching experience through a supervised on-site experience with a varsity athletic team.

ACE 364. Techniques of Coaching: Football. 2 Hours.
Designed to permit students to gain athletic coaching experience through a supervised on-site experience with a varsity athletic team.

ACE 365. Techniques of Coaching: Baseball. 2 Hours.
Designed to permit students to gain athletic coaching experience through a supervised on-site experience with a varsity athletic team.

ACE 366. Techniques of Coaching: Volleyball. 2 Hours.
Designed to permit students to gain athletic coaching experience through a supervised on-site experience with a varsity athletic team.

ACE 368. Sport Movement Analysis. 3 Hours.
PR: PET 124 and PET 125 with a minimum grade of C-. This course is designed to introduce a prospective coach to the principles of human movement.

ACE 369. Basic Strength/Condtn-Coaches. 3 Hours.
PR: EXPH 365 and (EXPH 364 or (PET 124 and PET 125)) with a minimum grade of C- in each. Present basic exercise performance methodologies to assist in coaching athletics. Types of training include speed drills, agility drills, conditioning workouts, flexibility exercises, balance-improvement drills, and proper training-environment safety techniques.

ACE 410. Training Theories for Coaches. 3 Hours.
PR: PET 124 and PET 125 and PR or CONC: EXPH 365. Application of sport training theories to building, designing and assessing athlete training plans, seasonal team development and long term athlete development from physical literacy to peak performance at all participation levels.

ACE 450. Career Planning in Sport. 3 Hours.
Students will utilize the Career Service Center and demonstrate a working knowledge of various job search strategies and career planning.

ACE 488. Practicum Coaching Exceptional Athletes. 3 Hours.
PR:ACE 315. Integration of theoretical knowledge and development issues with practical field experiences working with exceptional athletes.

ACE 489. Practicum Coaching Youth Sport. 3 Hours.
PR: ACE 256, PET 244, and one of the ACE Techniques of Coaching. Integration of theoretical knowledge and development issues with practical field experiences in coaching youth.

ACE 491. Professional Field Experience. 1-6 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

ACE 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ACE 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

ATHLETIC TRAINING

ATTR 121. Sport Injury Control and Management. 3 Hours.
Training, conditioning, protection, and other injury prevention measures. First aid, emergency service, and care related to physical education and athletics.

AVIATION MANAGEMENT

AVIA 101. Private Pilot. 3 Hours.
PR: Consent. Knowledge and skills necessary for a FAA private pilot certificate. Topics include aerodynamics, systems, regulations, airspace, performance, weather, flight publications, navigation, basic flight physiology, and flight safety. Flight training to obtain a private pilot certificate.

AVIA 181. Professional Field Experience. 1-3 Hours.
PR: Consent. Flight training conducted in conjunction with AVIA 101 necessary to obtain a FAA private pilot certificate.

AVIA 201. Instrument Rating. 4 Hours.
PR: Consent. Provides the knowledge required for an instrument rating. Includes instrument flight regulations, air traffic control system and procedures, instrument navigation and approaches, charts, weather, safety, aeronautical decision making, and crew resource management.

AVIA 231. Commercial Pilot. 4 Hours.
PR: Consent. Knowledge and skills required to obtain a FAA commercial pilot certificate. Topics include regulations, aerodynamics, meteorology, performance, pilotage, dead reckoning, navigation aids, aeronautical decision making, aircraft systems, night and high altitude operations, and commercial maneuvers.
AVIA 241. Multi-Engine Rating. 2 Hours.
PR: Consent. Provides the knowledge and skills necessary to safely and proficiently exercise the privileges and responsibilities of a multi-engine aircraft rating. Includes multi-engine aircraft systems, multi-engine aerodynamics, weight and balance, aircraft performance, and abnormal/emergency procedures.

AVIA 281. Professional Field Experience 2. 1-9 Hours.
PR: Consent. Flight Training conducted in conjunction with most AVIA 200 level courses.

AVIA 301. Principles of Aviation Instruction. 3 Hours.

AVIA 302. Initial Flight Instructor. 3 Hours.
PR: Consent. Provides the knowledge and skills necessary to conduct flight and ground instruction. Includes subject areas necessary for a private and commercial pilot training, intensive instruction and practice in lesson plans, in-flight instruction, debriefing and analysis.

AVIA 304. Instrument Flight Instructor. 2 Hours.
PR: Consent. A study of the material required to teach the instrument rating combined with a study of teaching responsibilities and techniques. Topics include regulations, air traffic control, navigation, instrument approach procedures, weather, ADM, and CRM.

AVIA 306. Advanced Flight Instructor. 1 Hour.
PR: Consent. Provides the knowledge and skills necessary for adding an additional aircraft rating to the flight instructor certificate. Includes aircraft limitations specifications, flight training differences, safety factors, effective evaluations, and flight instructor responsibilities.

AVIA 351. Crew Resource Management. 3 Hours.
PR: Consent. A study of human interactions that affect the safety of flight. Coursework emphasizes crew coordination, situational awareness, communication, workload management, decision making, and human error management essential to the safe operation of a professional crew.

AVIA 352. ATP/Turbine Aircraft Operations. 3 Hours.
PR: Consent. This course includes an in-depth study of regional jet systems, FMS navigation, airline crew resource management and airline standard operating procedures. The topics covered apply to many regional jet aircraft and some turbo prop aircraft.

AVIA 380. Aviation Weather. 3 Hours.
A study of weather as it relates to aviation, with emphasis on weather concepts, reporting systems, forecasting systems, hazards, weather and flight planning, weather in relation to aircraft performance, and weather reporting hardware and software.

AVIA 381. Professional Field Experience 3. 1-9 Hours.
PR: Consent. Flight training conducted in conjunction with AVIA 241 and 300-level AVIA courses.

AVIA 382. Aerodynamic and Aircraft Performance. 3 Hours.
A study of the fundamental principles of aerodynamics and aircraft performance. Includes terminology, the four forces of flight, aerodynamic stall, stability and control, weight and balance, and flight at slow, transonic and supersonic speeds.

AVIA 383. Aircraft Systems. 3 Hours.
A detailed study of basic and advanced aircraft systems, including piston and turbine powerplants, electrical, hydraulic, fuel, lubrication, pneumatic, ignition, pressurization, landing gear, environmental, fire detection/extinguishing, flight control, and brake systems.

AVIA 385. Air Traffic Control and Airspace. 3 Hours.
A study of the national airspace system and air traffic control, includes the US air traffic control system, communication systems, ATC procedures, regulations, navigational equipment, tower operations, TRACON and center operations, and environmental issues.

AVIA 480. Human Factors in Flight. 3 Hours.
A comprehensive look at human factors in aviation, including the meaning of human factors; human error; fatigue, body rhythms sleep; fitness performance; vision visual illusions; motivation leadership; communication; attitudes persuasion; training training devices; education application. (web course).

AVIA 483. Air Transportation. 3 Hours.
A comprehensive review of the history and role of air transportation. Topics include historical and present status of air transport; regulation and administration of the industry; perspectives on pilots, mechanics, operators, and owners; and evolution of aviation law, aircraft safety, facilities, security, and labor relations. (web course).

AVIA 484. Aviation Safety. 3 Hours.
Provides practical guidance on aircraft command techniques used during routine and unexpected situations. Includes the role of captain, characteristics of effective leaders, judgement and decision skills, management of resources, communication techniques and emergency situations.

AVIA 485. Aviation Economics. 3 Hours.
Middle and upper management decision making in a volatile airline industry. Topics include output, unit cost, traffic, and yield; operating expenses and relationships driving profit and loss. (web course).

AVIA 486. Aviation Management and Leadership. 3 Hours.
Explores management methods used by aviation crew, management, suppliers, service providers, and manufacturers. Focuses on decision analysis, decision research, peer-to-peer communication, sales management, emotional intelligence, and the Johari Window.
AVIA 487. Aviation Security. 3 Hours.
PR: Consent. Presents basic information on security issues and concerns in the aviation industry. It includes the historical aspects of aviation security, information on current security operations and information on the security tools used within the industry.

AVIA 488. Aviation Stories: Aviation and the Humanities. 3 Hours.
An understanding of how the business of flying and flying for pleasure have influenced literature; readings from journals, memoirs, fiction, and nonfiction dealing with the human side of aviation.

AVIA 489. Aviation Law. 3 Hours.
Overview of basic principles of U.S. law, with an emphasis on application of principles of aviation transactions and activities; recognition and avoidance of common legal pitfalls in aviation; and practical knowledge and understanding of basic legal concepts for managers, pilots, and mechanics; legal ramifications on administrative law, labor relations, airspace, and airport management. (web course).

BIOLOGY

BIOL 105. Environmental Biology. 3 Hours.
(Intended for non-biology majors.) Population growth and human impacts on the environment, including ecosystem destruction, biological diversity, pollution, and global climate change are explored to obtain the concepts necessary to understand complex environmental issues of our time.

BIOL 106. Environmental Biology Laboratory. 1 Hour.
CoReq: BIOL 105. Field and laboratory exercises explore fundamental ecological concepts and environmental problems, such as biodiversity, pollution, and natural resource utilization.

BIOL 107. Biotechnology and Society. 3 Hours.
An overview of the use of biotechnology to solve agricultural, medical, and environmental problems. Bioethical concerns and societal impacts of the use of the technologies will be discussed.

BIOL 111. General Biology. 4 Hours.
PR or CONC: ENGL 101. A comprehensive introductory course investigating the major areas of modern biology including scientific method, biological molecules, cell structure and function, histology metabolism and the anatomy and physiology of animals. Laboratory exercises include vertebrate dissection.

BIOL 112. General Biology. 4 Hours.

BIOL 122. Human Sexuality. 3 Hours.
A study of biological, behavioral and societal aspects of sexuality. Issues considered include changing fecundity, social-legal implications, sex roles, sexually transmitted diseases, populations, erotica, aging, dysfunctions, and decision-making skills for sex related issues.

BIOL 225. Biology Methods. 3 Hours.
An introduction to scientific thinking, hypothesis generation, design of experiments, analysis of data, literature search, and writing a research paper. Includes basic laboratory safety and lab and field skills for biologists.

BIOL 230. Human Anatomy and Physiology 1. 4 Hours.
PR: PSC sections require BIOL 102 and BIOL 104 or nursing major or consent, WVUIT sections require BIOL 112. The study of human body structure and function. Lecture emphasizes the integumentary, skeletal, muscular, and nervous systems, and special senses. Laboratory includes a complete cat dissection.

BIOL 231. Human Anatomy and Physiology 2. 4 Hours.
PR: PSC sections require BIOL 230 and Nursing major or consent, WVUIT sections require BIOL 230. A continuation of BIOL 230. The following systems are thoroughly studied: endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary, and reproductive. Laboratory work involves physiological investigations and dissections.

BIOL 240. Microbiology. 4 Hours.
PR: BIOL 112 or BIOL 231 or CHEM 116. Comprehensive introduction to the biology of microorganisms with special emphasis on bacteria and viruses. Includes aspects of disease prevention and control, and human immunology. Laboratory exercises on physiology, identification, and culturing of bacteria.

BIOL 236. Vertebrate Embryology. 4 Hours.
PR: BIOL 112 or BIOL 219. An experimental and descriptive analysis of vetebrate development. Students on the Morgantown campus will be required to complete BIOL 219.

BIOL 338. Behavioral Ecology. 3 Hours.
PR: BIOL 112 or BIOL 221. Consideration of the influences of environmental factors on short-and long-term regulation, control, and evolution of the behavior of animals. Students on the Morgantown campus will be required to complete BIOL 221.
BIOL 343. Systematic Zoology. 4 Hours.
PR: BIOL 112 and CHEM 115. Phylogeny, taxonomy and morphology of invertebrate and vertebrate phyla. Collection, dissection and preservation of specimens.

BIOL 347. Parasitology. 4 Hours.
PR: BIOL 112. The study of parasites and their effects on their host. Parasites of major medical importance to humans and their companion/agricultural animals; evolutionary relationships between parasites and hosts. Laboratory will include observations of preserved and live (if possible) specimens and discussions of current research on evolution of host/parasite relationships.

BIOL 354. Organismal Botany. 4 Hours.
PR: BIOL 112 and CHEM 115. Anatomy, growth, reproduction, and biochemical and physiological processes of higher plants; survey of algae, fungi, nonvascular and vascular plants. Laboratory exercises on anatomy, physiology, and ecology of plants.

BIOL 416. Cell Biology. 4 Hours.
PR: BIOL 112 and (CHEM 112 or CHEM 116). Study of the structure and function of prokaryotic and eukaryotic cells with an emphasis on eukaryotes. Areas of focus include biological molecules, membrane structure and function, intracellular sorting, the cytoskeleton, cell adhesion, cell signaling, and bioenergetics. Also includes an introduction to the cells of the immune system, cell death, and cancer. Laboratory exercises emphasize microscopy, sterile technique, and the growth and manipulation of cells in culture.

BIOL 417. Biotechnology. 4 Hours.
PR: BIOL 112 and (CHEM 112 or CHEM 116). Study of the structure, function, and regulation of DNA with an emphasis on recombinant DNA technology and related techniques that are used to analyze and manipulate DNA, RNA, and proteins. Also covered are applications of this technology in agriculture, industry, medicine, forensics and scientific discovery. Examination of appropriate research papers from the scientific literature illustrates the use of specific techniques.

BIOL 440. Comparative Anatomy. 4 Hours.
PR: WVU sections require BIOL 219 and BIOL 221 or consent, WVUIT sections require BIOL 112. A functional and evolutionary study of vertebrate structure. (Dissection kit required.)

BIOL 452. Plant Taxonomy. 4 Hours.
PR: BIOL 112. Classification, phylogeny and morphology of vascular plants. Laboratory and field trip emphasis on West Virginia flora.

BIOL 454. Immunology. 3 Hours.
PR: BIOL 240 or BIOL 219. Explores the fundamental principles and practices of immunology including how the immune system is organized, how it functions to keep us healthy, and how it can cause allergies and autoimmune disease.

BIOL 461. Principles of Evolution. 3 Hours.
PR: BIOL 112 or BIOL 221. Introduction to the study of evolution, including genetics of evolutionary change, speciation and adaptation molecular evolution, the history of life, extinction, co-evolution and the origins of humans. Students on the Morgantown campus will be required to complete BIOL 221.

BIOL 466. Ecology. 4 Hours.
PR: BIOL 112 and CHEM 116. Principles of environmental biology, population dynamics and evolution. Field trips and lab work.

BIOL 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

BIOL 494. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

BIOL 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

BIOL 497. Research. 1-6 Hours.
Independent research projects.

BUSINESS ADMINISTRATION

BUSA 101. Introduction to Business. 3 Hours.
An introduction to the contemporary business world, including international and small business, quality, ethics, and career preparation. The role of accounting, economics, finance, management, and marketing activities are investigated.

BUSA 293. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

BUSA 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.
BUSINESS CORE

BCOR 320. Legal Environment of Business. 3 Hours.
Explores the relationship of law, government and ethics to business enterprise. Provides overview of legal and ethical issues relevant to business decision-making and planning and the government regulations of business.

BCOR 350. Principles of Marketing. 3 Hours.
PR: WVU sections require ACCT 202 and CS 101 and ECON 202 and (ECON 225 or STAT 211) and ENGL 102 with a minimum grade of C- in each and (MATH 150 or MATH 155 or MATH 156) with a minimum grade of D-; WVUIT sections require ECON 201 with a minimum grade of C-. Overview of marketing and the interrelationships between marketing and other business disciplines. Topics include the management of the product, communication, price, and distribution variables as well as introduction to buyer behavior and marketing research.

BCOR 360. Supply Chain Management. 3 Hours.
PR: BCOR 330. The course acquaints students with a variety of production and operations management concepts and techniques. Productivity, competitiveness, operations strategy, capacity, location, layout, inventory, forecasting, and supply chain management are key concepts covered.

BCOR 370. Managing Individuals and Teams. 3 Hours.
Topics include traditional management functions, employee motivation, leadership, team dynamics, individual and group decision-making, and individual differences. Additional topics include social responsibility and ethics, diversity, organizational structure and design, organizational control, and managing innovation and change.

BCOR 460. Contemporary Business Strategy. 3 Hours.
PR: BCOR 320 and (BCOR 340 or FIN 325) and BCOR 350 and BCOR 360 and BCOR 370. The course focuses on the total organization and strategy development and execution that lead to the achievement of the organization's objectives and a superior position in the competitive environment in which it operates.

BUSINESS LAW

BLAW 420. Law for the Certified Public Accountant. 3 Hours.
PR: BCOR 320. (Credit cannot be received for both BLAW 310 and BLAW 420.) A survey of those areas of commercial and regulatory law with which accountants need familiarity in order to exercise good judgement, practice their profession skillfully and understand their professional responsibility.

CAREER-TECHNICAL EDUCATION

CTED 100. Teacher Education Orientation. 1 Hour.
College regulations, State Department of Education Policies and Certifications, effective study habits, use of resources, career opportunities.

CTED 201. Introduction to Career Technical Education. 3 Hours.
Purpose, nature and scope of vocational education for the vocational teacher. General orientation to career technical education instruction.

CTED 301. Occupational Analysis. 3 Hours.
Analysis procedures for determining career technical curriculum content, determination of course goals and objectives. Involvement of advisory committees in career technical education.

CTED 302. Course Construction and Planning in Career Technical Education. 3 Hours.
Analysis procedures for determining vocational curriculum content. Determination of course goals and objectives. Involvement of advisory committees for vocational education. Factors, principles, and techniques of developing a course of study for a career-technical education program.

CTED 303. Organization and Management of School Shops and Laboratories. 3 Hours.
Responsibilities of the teacher as a manager, methods of handling tools and supplies, problems of effective shop organization and maintenance, safety administration, job evaluation and selection, group control and management.

CTED 304. Safety in Career Technical Education. 3 Hours.
Responsibilities of the teacher in providing a safe learning-working environment for career technical students. The study of effective approaches to accident prevention and an introduction to the laws and regulatory agencies regarding safety management in the classroom and laboratory.

CTED 305. Methods of Examination in Career Technical Education. 3 Hours.
An introduction to the methods and techniques for developing and administering written and performance tests. Course includes the charting of student progress and methods for determining student grades for a grading period.

CTED 306. Coordination of Cooperative Career Technical Education. 3 Hours.
Background of coordination of cooperative part-time students. Methods and techniques for evaluating and selecting work stations, student selection, placement and follow-up. Role and use of advisory committees, and methods of evaluating a cooperative work experience program.

CTED 307. Computer Applications in Career Technical Education. 3 Hours.
This course is designed to introduce students to computer-based instructional technology used in today's classrooms and labs. Included is an introduction to operating systems, application software for instruction, and instructional management.

CTED 308. Application of Basic Skills in Career Technical Education. 3 Hours.
Methods, techniques and strategies for incorporating the reinforcement of basic skills in career technical instructional program. Emphasis will be placed on reading, writing, math, oral communication, and critical thinking skills as they apply to occupational specific training. Also addressed in this course is the teaching of job seeking and job keeping skills.
CTED 402. History and Philosophy of Career Technical Education. 3 Hours.
Historical influences in the development of vocational education in America and Europe; motivating influences and the implications of philosophy in modern career technical education.

CTED 409. Coordination of Career Technical Youth Activities. 3 Hours.

CTED 411. Supervision of Career Technical Education. 3 Hours.
Supervisory techniques for local, area and state levels; analysis of supervisory needs, duties and responsibilities, cooperation between school, labor management, and public agencies. Emphasis on improvement of instruction.

CTED 413. Advanced Materials for Career Technical Education. 3 Hours.
Particular emphasis on developing individually prescribed instructional materials for special teaching areas. Time available for each student to work on an individual basis to complete work assignment.

CTED 415. Audio/Visual Productions in Career Technical Education. 3 Hours.
Developing audio/visual equipment. Designing, programming and editing audio/visual productions for career technical teacher education.

CTED 418. Demonstrations for Teachers in Career Technical Education. 3 Hours.
The presentation of specific demonstration to selected teachers and student in the vocational teacher's specialization. Critiquing demonstrations of others and comparing techniques employed.

CTED 419. Observations for Teachers in Career Technical Education. 3 Hours.
Classroom visitations and written critiques of shops and laboratories in the teacher skill specialization. Observations of the industrial application of job skills in the teacher's specialization. Comparison of industrial and vocational education shops and laboratories.

CTED 420. School-Community Relations in Career Technical Education. 3 Hours.
Organization and planning for a program of school-community relations by the vocational teacher. Emphasis on preparing brochures, displays, news articles, conducting open house activities and working with members of the community.

CTED 421. Teaching Special Students in Career Technical Education. 3 Hours.
Instructional planning for individual student needs. Special instructional techniques, and modification of the learning environment/physical setting for special students in career technical education.

CTED 422. Back to Industry Experience. 1-6 Hours.
An occupational specialization updating experience for the in-service, career technical teacher. In-service teacher will gain new knowledge and skill in an occupational specialization through back-to-industry experience. Hours of credit will vary according to the depth and magnitude of the experience. Credit shall be earned on a pass/fail basis.

CTED 423. Industrial Processes. 1-3 Hours.
Special seminars or workshops designed for specific occupational specializations updating. Special topics shall be designed to provide the in-service, career technical teacher with new knowledge and skill currently required of workers in business and industry Hours of credit will vary according to the depth and magnitude of the training. Credit shall be earned on a pass/fail basis.

CTED 424. Industrial Processes. 1-3 Hours.
Special seminars or workshops designed for specific occupational specializations updating. Special topics shall be designed to provide the in-service, career technical teacher with new knowledge and skill currently required of workers in business and industry Hours of credit will vary according to the depth and magnitude of the training. Credit shall be earned on a pass/fail basis.

CTED 425. Industrial Processes. 1-3 Hours.
Special seminars or workshops designed for specific occupational specializations updating. Special Topics shall be designed to provide the in-service, career technical teacher with new knowledge and skill currently required of workers in business and industry. Hours of credit will vary according to the depth and magnitude of the training. Credit shall be earned on a pass/fail basis.

CTED 485. Teaching Methods in Career Technical Education. 3 Hours.
Correlating shop/lab instruction with classroom instruction. Individual and group instruction using various instruction sheets and materials. Emphasis is given to the four teaching steps in career technical education. Physical factors relating to classroom and shop/lab methods and techniques.

CTED 493. Special Topics. 1-6 Hours.
Investigation of topics not covered in regularly scheduled courses.

CHEMICAL ENGINEERING

CHE 100. Introduction to Chemical Engineering. 2 Hours.
Introduction to engineering practice with an emphasis on Chemical Engineering. Course projects are designed to develop problem solving, teamwork, and communication skills. Project and laboratory work will be provided to demonstrate engineering concepts.

CHE 201. Material and Energy Balances 1. 3 Hours.
PR: MATH 155 and CHEM 116 and PR or CONC: ENGR 102 or CHE 102. Introduction to chemical engineering fundamentals and calculation procedures, industrial stoichiometry, real gases and vapor-liquid equilibrium, heat capacities and enthalpies, and unsteady material balances and energy balances. (2 hr. lec., 2 hr. calc. lab.).
CHE 202. Material and Energy Balances. 2 Hours.
PR: (CHE 201 or CHE 211) and PR or CONC: CHE 230. Continuation of CHE 201. (2 hr. lec., 2 hr. calc. lab.).

CHE 312. Separation Processes. 3 Hours.
PR: CHE 310 and CHE 311 and CHE 320. Equilibrium stage and multiple stage operations, differential countercurrent contracting, membrane separations, fluid-particle separations.

CHE 316. Transport Operations. 4 Hours.
PR: PHYS 213 and MATH 156. Physical phenomena associated with the movement and processing of fluids, and the generation and transport of thermal energy. Emphasis on quantitative models to design engineering systems and predict performance. Applications of these principles will be demonstrated in a variety of natural and engineering systems.

CHE 318. Particle Processing Operations. 2 Hours.
PR: CHE 316 or (CHE 310 and CHE 311). Physical Phenomena associated with the movement and processing of particulate solids. Fluid-solid separations, particle formation, solids transport and storage.

CHE 320. Chemical Engineering Thermodynamics. 3 Hours.
PR: (CHE 202 or CHE 212) and MATH 251. First and second laws of thermodynamics. Thermodynamic functions for real materials. Physical equilibrium concepts and applications. (2 hr. lec., 2 hr. calc. lab.).

CHE 327. Kinetics and Reactor Design. 3 Hours.
PR: CHE 320. Kinetic models applied to the analysis and design of chemical reactors. Kinetic rate theory, homogeneous reactions in batch and flow systems, heterogeneous reactions and catalysis. Use of stirred tank and plug flow reactor models, temperature effects, effect of heat transfer, and catalytic reactors. Computer modeling is emphasized for design and analysis.

CHE 330. Modeling and Analysis. 3 Hours.
PR: MATH 156. Topics include mathematical modeling of systems, numerical solution of algebraic and differential equations, approximation of mathematical relations.

CHE 350. Chemical Engineering Laboratory. 2 Hours.
PR: CHE 316 or (CHE 310 and CHE 311). Planning of experiments, data collection, statistical analysis of experimental data, and reporting of results.

CHE 357. Design Laboratory 1. 1 Hour.
PR or CONC: CHE 316 and CHE 320 Analysis and synthesis in the design of processing systems and products. Economic evaluation, project management, flowsheet development, equipment selection, equipment specification, optimization, computer-aided design, process operability and control, process safety, and environmental protection. Team and individual projects are primary vehicles for assessment and skill development.

CHE 358. Design Laboratory 2. 1 Hour.
PR: CHE 357 and PR or CONC: CHE 317 and CHE 327. Continuation of CHE 357.

CHE 411. Advanced Heat Transfer. 3 Hours.
PR: (CHE 311 or CHE 316) or MAE 423. Heat Transmission in the processing industries, with an emphasis on the design of equipment used to reclaim thermal energy, supply process energy needs, and remove heat in critical cooling operations.

CHE 417. Advanced Separation Processes. 3 Hours.
PR: CHE 312 or CHE 317. Analysis and design of diffusional separation operations. Solution of mathematical models of binary and multi-component separations, equipment selection, energy consumption, and selection of appropriate thermodynamic models. Computer-aided design is emphasized.

CHE 435. Chemical Process Control. 3 Hours.
PR: (CHE 230 or CHE 330) and (CHE 325 or CHE 327). Transient behavior of chemical process flow systems, linearization and stability. Process control system design including frequency response analysis. Instrumentation and hardware.

CHE 450. Unit Operations Laboratory 1. 2 Hours.
PR: (CHE 312 or CHE 317) and (CHE 350 or CHE 351). Operation of chemical process engineering equipment; collection, analysis, and evaluation of laboratory report preparation. (4 hr. lab.).

CHE 451. Unit Operations Laboratory 2. 2 Hours.
PR: CHE 450. Continuation of CHE 450. (4 hr. lab.).

CHE 457. Design Laboratory 3. 2 Hours.
PR: CHE 358. Continuation of CHE 358.

CHE 458. Design Laboratory 4. 2 Hours.
PR: CHE 457. Continuation of CHE 457.

CHE 461. Polymer Science and Engineering. 3 Hours.
PR: CHEM 233. Polymer classification, polymer synthesis, molecular weights and experimental techniques, thermodynamics, rubber elasticity, mechanical behavior, crystallization, diffusion, rheology, extrusion and injection molding. (3 hr. lec.).

CHE 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.
CHE 496. Senior Thesis. 1-3 Hours.
PR: Consent.

CHEMISTRY

CHEM 111. Survey of Chemistry. 4 Hours.
PR: WVU sections require MATH 122 with a minimum grade of C- or ALEKS Score of ML 20 or Math ACT Score of 22 or Math SAT Score of 540 or Math SAT (March 2016) Score of 570 or PR or CONC: MATH 126A or MATH 126B or MATH 126C or MATH 129 or MATH 150 or MATH 153 or MATH 155, WVUIT and PSC sections require MATH 122 with a minimum grade of C- or ALEKS Score of ML 10 or Math ACT Score of 19 or Math SAT Score of 460 or Math SAT (March 2016) Score of 500 or PR or CONC: MATH 126A or MATH 126B or MATH 126C or MATH 129 or MATH 150 or MATH 153 or MATH 155. Designed primarily for students taking only one year of college chemistry. Atomic structure; chemical bonding; acids, bases, and salts; periodicity; properties of gases, liquids, and solids; stoichiometry; oxidation-reduction. (3 hr. lec., 3 hr. lab.) (Students may not receive credit for CHEM 115 or CHEM 117 and for CHEM 111.)

CHEM 112. Survey of Chemistry. 4 Hours.
PR: CHEM 111. Continuation of CHEM 111. Nuclear chemistry; air and water pollution; useful natural materials; consumer chemistry; introduction to organic and biochemistry. (3 hr. lec., 3 hr. lab.) (Students may not receive credit for CHEM 116 or CHEM 118 and for CHEM 112.) (CHEM 111 and CHEM 112 cannot be used as pre-requisite courses for organic chemistry;) students anticipating the possibility or likelihood of taking organic chemistry must have credit for (CHEM 115 and CHEM 116) and (CHEM 117 and CHEM 118).

CHEM 115. Fundamentals of Chemistry. 4 Hours.
PR: Satisfactory ACT/SAT or placement exam performance, or minimum grade of C- in CHEM 110B, or minimum grade of C- in ((MATH 126A or MATH 126B or MATH 126C) and MATH 128), or minimum grade of C- in MATH 129 or higher. For students who need more than one year of college chemistry and quantitative relationships on which subsequent chemistry courses are built. (3 hr. lec. 3 hr. lab.) (Students may not receive credit for CHEM 117 and CHEM 115.) Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

CHEM 116. Fundamentals of Chemistry. 4 Hours.
PR: CHEM 115. Continuation of CHEM 115. (3 hr. lec., 3 hr. lab.) (Students may not receive credit for CHEM 118 and for CHEM 112 or CHEM 116.) Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

CHEM 215. Introductory Analytical Chemistry. 4 Hours.
PR: CHEM 116. Volumetric analysis, gravimetric analysis, solution equilibria, spectrophotometry, separations, and electrochemical methods of analysis. (2 hr. lec., two 3 hr. labs.) (Students may not receive credit for CHEM 215 and for CHEM 117 and CHEM 118).

CHEM 233. Organic Chemistry. 3 Hours.
PR: CHEM 116 or CHEM 118 and PR or CONC: CHEM 235. Basic principles of organic chemistry. Modern structural concepts, the effect of structure on physical and chemical properties, reactions and their mechanisms and application to syntheses. (3 hr. lec.) (Students may not receive credit for CHEM 233, CHEM 234, and for CHEM 231.)

CHEM 234. Organic Chemistry. 3 Hours.
PR: CHEM 233 and CHEM 235 and PR or CONC: CHEM 234. Continuation of CHEM 233. (3 hr. lec.).

CHEM 235. Organic Chemistry Laboratory. 1 Hour.
PR or CONC: CHEM 233. Fundamental organic reactions and the preparation of organic compounds. (3 hr. lab.).

CHEM 236. Organic Chemistry Laboratory. 1 Hour.
PR: CHEM 233 and CHEM 235 and PR or CONC: CHEM 234. Continuation of CHEM 235. (3 hr. lab.).

CHEM 310. Instrumental Analysis. 3 Hours.
PR: (CHEM 215 or CHEM 118) and (CHEM 341 or CHEM 346). Lectures and demonstrations. Fundamentals of instrumental methods applied to chemical analyses: electrochemistry, spectroscopy, mass spectrometry, and chromatography. (2 hr. lec., 1 hr. demonstration.).

CHEM 346. Physical Chemistry. 3 Hours.
PR: CHEM 234 and MATH 156 and PHYS 112. A first course in physical chemistry. Topics include a study of thermodynamics and chemical equilibria. (3 hr. lec.) (Students may not receive credit for CHEM 346 and for CHEM 341.).

CHEM 347. Physical Chemistry Laboratory. 1 Hour.
PR: (CHEM 118 or CHEM 215) and CHEM 346. Experimentation illustrating the principles of physical chemistry and offering experience with chemical instrumentation. (One 3 hr. lab.).

CHEM 348. Physical Chemistry. 3 Hours.
PR: CHEM 346 and MATH 251. Continuation of CHEM 346. Chemical dynamics and the structure of matter. (3 hr. lec.) (Students may not receive credit for CHEM 348 and for CHEM 341.).

CHEM 349. Physical Chemistry Laboratory. 2 Hours.
PR: CHEM 346 and CHEM 347 and CHEM 348. Continuation of CHEM 347. (Two 3 hr. lab.).

CHEM 422. Intermediate Inorganic Chemistry. 3 Hours.
PR: Physical chemistry. Structure, bonding, and reactivity of compounds of main-group and transition metal elements. Molecular structure and symmetry, solid state chemistry, ligand field theory, and coordination chemistry. (3 hr. lec.).
CHEM 423. Inorganic Synthesis Laboratory. 2 Hours.
PR: CHEM 422. Application of modern synthetic and spectroscopic methods of analysis to the preparation and characterization of main group, solid-state, transition metal, and organometallic compounds. (Two 3 hr. lab.)

CHEM 440. Quantum Chemistry. 3 Hours.
PR: CHEM 348. Introduction to the principles of quantum mechanics and its application to atoms, molecules, solids, spectroscopy, and computational chemistry.

CHEM 451. Biochemistry. 3 Hours.
PR: CHEM 234 or consent. Protein structure, conformation, and dynamics. Enzymes and their reaction mechanisms. Carbohydrate and fatty acid genesis and metabolism. Biosynthesis of macromolecular precursors. Information storage, transmission and expression genetics.

CHEM 490. Teaching Practicum: Peer-Led Team Learning. 1-3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

CHEM 493. Special Topics. 0-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

CHEM 494. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

CHEM 497. Research. 1-6 Hours.
Independent research projects.

CIVIL ENGINEERING

CE 204. Surveying. 3 Hours.
PR: MATH 126 and MATH 128 and DRET 120. The measurement of distances, directions, elevations and areas on the earth’s surface; introduction to route surveying; introduction to computer programs for surveying.

CE 312. Construction Materials. 3 Hours.

CE 331. Transportation Engineering. 3 Hours.
PR: MAE 242 and CE 204. Introduction to integrated transportation systems, vehicle, roadway and human characteristics, traffic engineering studies, intersections and interchanges, highway geometric design, highway pavement design, transportation planning, highway capacity analysis and evaluation of alternatives.

CE 347. Introduction to Environmental Engineering. 4 Hours.
PR: WVU sections require CHEM 115 and MATH 251 with a minimum grade of C- in each, WVUIT sections require MAE 331 and CHEM 116. Introduction to physical, chemical, and biological characteristics of waters and wastewaters, and fundamental principles of water and wastewater treatment including hands-on laboratory exercises.

CE 351. Introductory Soil Mechanics. 4 Hours.
PR: WVU sections require MAE 241 and MAE 243 and MATH 261 with a minimum grade of C- in each, WVUIT sections require MAE 243 and GEOL 312. Introduction to geotechnical engineering, fundamental soil properties, classification of soils, soil compaction, permeability, compressibility, and consolidation of soils, shear strength, lateral earth pressures.

CE 361. Structural Analysis 1. 4 Hours.
PR: WVU sections require MAE 241 and MAE 243 and MATH 261 with a minimum grade of C- in each, WVUIT sections require MAE 243 and PR or CONC: MATH 251. Stability, determinacy, and equilibrium of structures; shear and bending moment diagrams of determinate and indeterminate beams and frames; analysis of trusses; displacement of planar structures by geometric and energy methods.

CE 411. Pavement Design. 3 Hours.
PR: WVU sections require CE 351, WVUIT sections required CE 312 and CE 331 and CE 351. Effects of traffic, soil, environment, and loads on the design and behavior of pavement. Design of pavement structures. Pavement performance and performance surveys.

CE 421. Hydraulic Engineering. 4 Hours.

CE 422. Advanced Hydraulic Engineering. 3 Hours.
PR: CE 421. Basic open channel flow concepts; energy and momentum principles in open channel flow; flow resistance; channel controls and transitions. Hydrology: physical and quantitative; rational, SCS.

CE 425. Engineering Hydrology. 3 Hours.
PR: WVU sections require CE 321, WVUIT sections require MAE 331. Scientific basis of the hydrologic cycle and its engineering implications; rainfall-runoff processes, hydrographs, flood routing, and statistical methods. (3 hr. lec.).
CE 431. Highway Engineering. 3 Hours.
P: WVU sections require CE 332, WVUIT sections require CE 204 and CE 331. Highway administration, economics and finance; planning and design; subgrade soils and drainage; construction and maintenance. Design of a highway. Center line and grade line projections, earthwork and cost estimates.

CE 432. Traffic Engineering. 3 Hours.
P: CE 332. Traffic engineering concepts and parameters, traffic data collection and analysis methods, theory and design of traffic control systems, traffic safety and operations analysis.

CE 444. Advanced Sanitary Engineering. 3 Hours.
P: CE 347. Contemporary practices in sewage disposal and advance waste treatment. Design of sedimentation units, biological treatment units, disinfection and advanced water treatment units.

CE 446. Solid Waste Management. 3 Hours.
P: CHEM 116 and CE 351 History of solid waste management. Laws and regulations pertaining to solid waste management. Sources, composition, and properties and municipal solid waste. Handling, collection, separation, transformation, transport, and disposal of solid waste including landfill design. Incineration, landfill closure, and recycling.

CE 451. Foundation Engineering. 3 Hours.
P: CE 351. Subsurface investigations and synthesis of soil parameters for geotechnical design and analysis, concepts of shallow and deep foundation design, geotechnical design of conventional retaining walls, computerized analysis and design of soil/foundation interaction; case histories. (3 hr. lec.).

CE 452. Groundwater and Seepage. 3 Hours.
P: CE 351. Fundamentals of groundwater flow; permeability; seepage principles; flownet interpretation; analytical and numerical solutions of confined and unconfined flows; filter design; geofabrics; subsurface drainage; groundwater contamination; disposal systems.

CE 453. Earthwork Design. 3 Hours.
P: CE 351. Use of soil mechanics principles in the analysis, design and construction of earth structures. Principles of compaction and compaction control; an introduction to slope stability analysis and landslides; earth reinforcement systems, and ground improvement techniques. (3 hr. lec.).

CE 461. Structural Analysis 2. 3 Hours.
P: WVU sections require CE 361, WVUIT sections require MATH 261 and PR or CONC: (CE 462 or CE 463). Fundamental theory of statically indeterminate structures; analysis of indeterminate beams, frames, and trusses by stiffness and flexibility methods; study of influence lines for beams, frames, and trusses.

CE 462. Reinforced Concrete Design. 3 Hours.
P: WVU sections require CE 361, WVUIT sections require PR or CONC: CE 361. Behavior and design of reinforced concrete members. Material properties, design methods and safety consideration, flexure, shear, bond and anchorage, combined flexure and axial load, footings, introduction to torsion slender columns, and pre-stressed concrete.

CE 463. Steel Design. 3 Hours.
P: CE 361. Material properties, design of steel bridge and building systems with emphasis on connections, beams, columns, plastic design, and cost estimates.

CE 464. Timber Design. 3 Hours.
P: CE 361. Fundamentals of modern timber design and analysis. Topics include wood properties, design of beams, columns, trusses, and other structures using dimension lumber, glue-laminated products and composites.

CE 479. Integrated Civil Engineering Design-Capstone. 3 Hours.
P: Senior standing and a minimum grade of C- in CE 411 or CE 415 or CE 431 or CE 439 or CE 447 or CE 451 or CE 453 or CE 462 or CE 463 or CE 464 or CE 465. Capstone integration of the civil engineering curriculum by comprehensive design experience to professional standards. Projects are performed in student groups under faculty supervision.

CE 493. Special Topics. 1-6 Hours.
P: Consent. Investigation of topics not covered in regularly scheduled courses.

COMMUNICATION SCIENCES AND DISORDERS

CSAD 270. Effective Public Speaking. 3 Hours.
Designed for improvement of the student's speech based upon theory and demonstrated performance of voice and diction skills and public-speaking skills for effective communication in a variety of speaking situations.

COMMUNICATION STUDIES

COMM 100. Principles of Human Communication. 1 Hour.
Introduction to the human communication process with emphasis on the principles, variables, and social contexts of communication.

COMM 102. Human Communication in the Interpersonal Context. 2 Hours.
Introduction to interpersonal communication with emphasis upon application of one to one communication in a variety of social contexts.
COMMUNITY HEALTH PROMOTION

CHPR 172. First Aid and Emergency Care. 2 Hours.
Emergency aid for the sick and injured. Emergency services aimed at reducing the potential of permanent disability or threats to life, as well as pain, damage, or suffering of a less serious nature.

COMPUTER ENGINEERING

CPE 271. Introduction to Digital Logic Design. 3 Hours.
PR: MATH 156 or consent. Introduction to the design of digital systems. Topics include number systems, coding, Boolean and switching algebra, minimization of logic, analysis and design of combinational and sequential logic circuits.

CPE 272. Digital Logic Laboratory. 1 Hour.
CoReq: CPE 271. Experiments with digital electronic circuits including number systems, design and application of modern digital circuitry for both combinational and sequential logic circuits. (3 hr. lab.).

CPE 421. Embedded Systems. 4 Hours.
Advanced family of processors (16, 32, 64 bit) studied in depth. Design and implementation of small embedded controllers. Register level programming with assembler language and C programs that reside and execute on the microcomputer. Use peripherals including serial I/O, parallel I/O, timers and interrupts. Design of basic interface circuitry and for the microcomputer. Design of small embedded systems around microcontroller board.

CPE 442. Introduction to Digital Computer Architecture. 3 Hours.
PR: (MATH 375 or MATH 378) and (CPE 310 or CPE 320). Control, data, and demand-driven computer architecture; parallel processing, pipelining, and vector processing; structures and algorithms for array processors, systolic architectures, design of architectures. (3 hr. lec.).

CPE 450. Introduction to Microelectronics Circuits. 3 Hours.
PR: EE 251. (VLSI-Very Large Scale Integrated) circuit design, including layout, simulation and performance optimization of basic digital logic functions and combinations of such basic functions into more complex digital system functions. CAD tools are used for projects. (3 hr. lec.).

CPE 455. VLSI Design. 3 Hours.
Physics of MOS devices, basic fabrication processes, basic logical elements, and logic design methods in NMOS an CMOS. Design rules and computation of circuit parameters from layout. Delay and power computation using a simple model. Design principles of memory circuits.

CPE 462. Wireless Networking. 3 Hours.
PR: EE 327 and (STAT 215 or MATH 448). Design and analysis of modern wireless data networks. Digital modulation techniques, wireless channel models, design of cellular networks, spread spectrum, carrier sense multiple access, ad-hoc networks routing, error control coding, automatic request strategies.

CPE 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

COMPUTER SCIENCE

CS 101. Intro to Computer Applications. 4 Hours.
Introduction to spreadsheets and databases for problem-solving in disciplines such as math, science, engineering, business, social sciences, behavioral sciences, and environment: using computer applications to create technical reports and presentations.

CS 112. Computer Science - Engineers 1. 3 Hours.
PR: (MATH 125A or MATH 125B or MATH 125C) and PR or CONC: MATH 128. An introduction to and study of a high level programming language, including elementary programming techniques with an emphasis on structured programming and engineering applications. Laboratory use of micro computers will be required.

CS 121. Computer Science 1. 4 Hours.
Co-requisites: MATH 126 or MATH 123. Introduction to computer science, problem solving techniques, and algorithmic processes, software design, structured programming, object oriented design and programming.

CS 122. Computer Science 2. 4 Hours.
PR:CS 121 with a grade of C or better. Software development with abstract data types; elementary data structures including lists, stacks, and queues; development of algorithms; classical sorting and search techniques; design methodolog; file processing; recursion; and object-oriented design and development.

CS 201. Data Structures. 3 Hours.
PR: CS 122 and CS 121 with a minimum grade of C-. Introduction to data structures with topics to include search and sort techniques, strings, arrays, stacks, trees, and list techniques. Selected examples will be implemented in a high level language such as Pascal.

CS 220. Discrete Mathematics. 3 Hours.
PR: (CS 110 with a minimum grade of C- or CS 122) and (MATH 154 or MATH 155). Mathematical concepts used in computer science such as sets, relations, functions, counting principles, graphs, trees, and automata; introduction to basic graph algorithms and applications. (3 hr. lec.).
CS 221. Analysis of Algorithms. 3 Hours.
PR: WVU sections require CS 111 with a grade of C- or better and CS 220 with a grade of C- or better and MATH 156, WVUIT sections require CS 201 and CS 220 and MATH 156. Introduction to algorithm design and analysis. Growth rate of functions and asymptotic notation. Divide-and-conquer algorithms and recurrences; searching and sorting; graph algorithms including graph searching, minimum spanning trees, and shortest paths.

CS 222. Intro Software Engineering. 3 Hours.
PR: CS 122 with a grad of C or better. Principles of software engineering such as modifiability, efficiency, reliability, and understandability. Techniques include information hiding, data abstraction and modularity. Laboratory work is required.

CS 231. Introduction to Computer Organization. 3 Hours.
PR: CS 122. Components of a computer system; number systems, arithmetic operators, and codes; logic design principles and digital devices; micro-operations and instruction sequencing; central processing unit - control unit, registers, ALU; I/O processing; interrupts; memory; micro-programming; pipe-lined and parallel computers.

CS 264. Data Base Management. 3 Hours.
PR: CS 221. A study of fundamentals of data base models. The primary emphasis will be the relational database model. Data base query language will be examined. The students will receive hands-on experience with a relational data base using the query language SQL.

CS 265. C Programming. 2 Hours.
PR: CS 121 with a grade of C or better. Functions, parameter passing, dynamic memory allocation, pointers, and elementary data structures in C; software design and implementation with emphasis on creating and modifying large programs in procedural paradigm.

CS 293. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

CS 310. Principles of Programming Languages. 3 Hours.
PR: CS 111 with a minimum grade of C- or CS 201. Theoretical and practical aspects of languages including internal representations, run-time environments, run-time storage management; historical, current, special purpose and experimental languages; finite-state automata, regular expressions and context-free grammars, language translation, semantics and paradigms. (3 hr. lec.).

CS 321. Introduction to Networking. 3 Hours.
PR: CS 122. Concepts of networking with the emphasis on TCP/IP layered model of networking. Students will learn IP routing, TCP, UDP delivery of packets to client applications and write client server applications using various protocols.

CS 324. Database Management. 3 Hours.
PR: CS 221. A study of fundamentals of data base models. The primary emphasis will be the relational database model. Data base query languages will be examined. The students will receive hands-on experience with a relational data base using the query language SQL.

CS 350. Computer System Concepts. 3 Hours.
PR: CS 111 with a minimum grade of C-. System software organization; operating system concepts including processes, threads, memory management, and the user interface; elementary network concepts. (Equivalent to CS 355).

CS 365. Computer Languages. 1 Hour.
PR: CS 221. A accelerated study of a programming language (such as C/C++, C#, JAVA, Visual Basic, Perl, ASP, HTML, Delphi, Ada, etc.) for students who have met the core curriculum courses in computer science.

CS 370. Microcontrollers. 1 Hour.
PR: CS 111 or CS 121 or consent. An introduction to microcontrollers. The use of development board and language, simple I/O, motor control (AC, DC and servos), some sensors, and microcontroller to PC communications will be covered. A project will be required of each student.

CS 410. Compiler Construction. 3 Hours.
PR: WVU sections require CS 310 with a C- or better or consent for non-majors, WVUIT sections require CS 310 or consent for non-majors. Theory and practice of the construction of programming language translators; scanning and parsing techniques, semantic processing, runtime storage organization, and code generation; design and implementation of interpreter or compiler by students. (3 hr. lec.).

CS 450. Operating Systems Structure. 3 Hours.
PR: CS 350 with a C- or better or CS 355. Support of computer components; device management and interrupts, process scheduling, file management, complete OS structure, OS development and debugging, configuration management, and performance testing. (3 hr. lec.).

CS 454. Cryptology. 3 Hours.
PR: MATH 441. This course is designed to give students in a basic introduction, the foundation, and developments in the field of cryptology. Mono-alphabetic substitutions, poly-alphabetic substitutions stream ciphers, block ciphers, public key cryptology, and quantum ciphers will be reviewed along with number theory and probability necessary for solving encryptions.

CS 456. Digital Image Processing. 3 Hours.
PR: MATH 156 and CS 201. This course covers techniques for image acquisition, transformation, enhancement, restoration, compression, segmentation, and recognition. A brief introduction to advanced topics such as motion detection, optical flow will also be included.
CS 465. Introduction to Cybersecurity. 3 Hours.
PR: CS 350 with a C- or better or CS 321 or consent. Covers the fundamentals of cybersecurity, including encryption, malicious code, authentication and access control, database security, operating system security, and network security. Provides students with a comprehensive overview of the cybersecurity threats, technologies for information assurance, and engineering approaches to build and maintain secure computer systems and networks.

CS 470. Introduction to Computer Graphics. 3 Hours.
PR: CS 201 or CS 210 with a minimum grade of C- or consent for non-majors. Overview of 3D graphics hardware and gaming consoles; focus on developing 3D graphics software; fundamental algorithms for real-time 3D graphics with focus on game engine component development; introduction to three-dimensional game engine development.

CS 472. Artificial Intelligence. 3 Hours.
PR: CS 222 or CS 230 with a minimum grade of C- or consent for non-majors. Survey of AI techniques, heuristic search, game playing, and knowledge representation schemes: logic, semantic net, frames, rule-based; natural language processing, advanced AI techniques/systems: planning, blackboard architecture, neural net model; AI implementation. (3 hr. lec.).

CS 475. Game Development. 3 Hours.
PR: CS 222 or (CS 220 and CS 310 with a minimum grade of C- in each). Design and implementation of games using innovative technology in human-computer interfaces. Principles of game design, physiology and psychology of each of the five senses, and technologies for delivering sensory stimuli.

CS 479. Advanced Computer Science Mathematics. 3 Hours.
PR: MATH 441 and MATH 448. Topics include applied numerical methods, statistical computing techniques, data smoothing and filtering. Emphasis will be placed on design and implementation. Students will utilize software packages such as SAS, MatLab, or MathCad.

CS 480. Senior Design. 2 Hours.
PR: ENGL 102 and consent. Penultimate semester. Group senior design projects with individual design assignments appropriate to student's discipline. Complete system-level designs of the subsequent semester's project presented in written proposals and oral presentations. (Equivalent to BIOM 480, CPE 480, and EE 480.) (2 hr. lec., 1 hr. conf.).

CS 481. Senior Project. 3 Hours.
PR: CS 480. Detailed design and implementation of the system including choice of components, algorithm development, interfacing, troubleshooting, working in groups, and project management. Also covers professional topics, including ethics, liability, safety, socio-legal issues, risks and employment agreements. (1 hr. lec., 1 hr. conf., 2 hr. lab.).

CS 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

CS 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

COMPUTERIZED DRAFTING AND DESIGN ENGINEERING TECHNOLOGY

DRET 120. Drafting 1. 2 Hours.
Fundamentals of drafting through the use of sketching and computer graphics as applied to orthographic views, sectional views, isometric views, and threads and fasteners. Also the student will be introduced to computer graphics early in the program and will be required to produce much of their work using CAD.

DRET 314. Computer Graphics. 3 Hours.
PR:DRET 120 or consent (for non-majors) Teaches use of the two dimensional graphics capability of the microcomputer, using the AutoCAD industrial software package. Also covers printer and plotter capabilities and provides an introduction to 3D computer graphics.

COOPERATIVE EDUCATION

COOP 101. Humanities Internship 1. 0 Hours.
Student enrolls for course to designate a supervised one or two term commitment to an off-campus work assignment in business or industry.

COOP 102. Humanities Internship 2. 0 Hours.
Student enrolls for course to designate a supervised one or two term commitment to an off-campus work assignment in business or industry.

COOP 103. Engineering Internship 1. 0 Hours.
Student enrolls for courses to designate a supervised one or two term commitment to an off-campus work assignment in business or industry.

COOP 104. Engineering Internship 2. 0 Hours.
Student enrolls for course to designate a supervised one or two term commitment to an off-campus work assignment in business or industry.

COOP 105. Engineering Technology Internship 1. 0 Hours.
Student enrolls for course to designate a supervised one or two term commitment to an off-campus work assignment in business or industry.

COOP 106. Engineering Technology Internship 2. 0 Hours.
Student enrolls for course to designate a supervised one or two term commitment to an off-campus work assignment in business or industry.
COOP 205. Cooperative Work Experience 1. 0 Hours.
Student enrolls for course to designate a supervised three to five term commitment to an off-campus assignment in business or industry.

COOP 206. Cooperative Work Experience 2. 0 Hours.
Student enrolls for course to designate a supervised three to five term commitment to an off-campus assignment in business or industry.

COOP 207. Cooperative Work Experience 3. 0 Hours.
Student enrolls for course to designate a supervised three to five term commitment to an off-campus assignment in business or industry.

COOP 208. Cooperative Work Experience 4. 0 Hours.
Student enrolls for course to designate a supervised three to five term commitment to an off-campus assignment in business or industry.

COOP 209. Cooperative Work Experience 5. 0 Hours.
Student enrolls for course to designate a supervised three to five term commitment to an off-campus assignment in business or industry.

CRIMINAL JUSTICE

CJ 101. Introduction to Criminal Justice. 3 Hours.
This course examines the history, structure, functions and issues related to criminal law, law enforcement, criminal adjudication, and corrections. The course also examines criminological theories and research, and the juvenile justice system. (Equivalent to SOCA 234).

CJ 202. Principles of Criminal Law. 3 Hours.
This course focuses on the history, scope, purpose, and definition of the criminal law. Topics include crimes against person, crimes against property, other offenses, interpretation of statutes, legal definitions of specific criminal offenses, rights of the accused, pre-trial procedures, the criminal trial, sentencing, and the appeal process.

CJ 233. Juvenile Justice. 3 Hours.
PR: CJ 101 or SOCA 234. The history, philosophy, and processes of the juvenile justice system are studied. The juvenile court’s jurisdiction over juvenile delinquency, status offenses, and abuse and neglect is examined. Topics include juvenile rights, types of juvenile correctional institutions and community based correctional alternatives for juveniles.

CJ 240. Correctional Counseling. 3 Hours.
A survey of contemporary counseling interventions for juvenile and adult offenders with an emphasis on cognitive and behavior modifications strategies. Other counseling models will also be examined.

CJ 245. Adjudication Process. 3 Hours.
PR: CJ 101. Role and structure of prosecution, public defense, and the courts; basic elements of the substantive criminal law; procedural law and its relation to constitutional guarantees.

CJ 310. Law Enforcement Administration. 3 Hours.
This course introduces the history of law enforcement in the United States, the roles of law enforcement officers, the purpose of policing, police conduct, police administration, and community relations.

CJ 316. Community Based Corrections. 3 Hours.
The history, philosophy, types and current trends in community based corrections is studied. Specifically, probation, parole, diversion programs, and intermediate sanctions including house arrest, community service, restitution, halfway houses, and temporary release are examined.

CJ 320. Courts and Judicial Systems. 3 Hours.
This course focuses on the structure and philosophy of the court system with special emphasis on court procedures, constitutional guarantees, the trial process, the role of judges, prosecutors, defense attorneys and juries.

CJ 324. Drugs, Crime and Society. 3 Hours.
PR: SOCA 101 and (CJ 101 or SOCA 234). Examines the fundamentals of mood-altering chemicals and their effects on the individual, the criminal justice system, and society. Addresses the current US policy regarding substance abuse, investigation, prevention, treatment, criminality, and education.

CJ 401. Research Methods in Criminal Justice. 3 Hours.
PR: STAT 111 or STAT 211. A general introduction to the process of research emphasizing research design, techniques of data collection including electronic methods, analysis and interpretation of research results as applied to the study of criminal justice.

CJ 410. Criminal Investigations. 3 Hours.
This course focuses on that aspect of the American legal and judicial system associated with the investigative processes as conducted by law enforcement and forensic science. Included will be an examination of the role of crime scene investigation, witness interviewing, and the investigators relationship with the prosecution.

CJ 475. Seminar in Criminal Justice-Capstone. 3 Hours.
This capstone course integrates the knowledge and skills the students have acquired during all of their major course work. All students must be Criminal Justice Seniors in good standing and have permission of the instructor. Instruction will be in the classroom with two field trips outside the classroom setting.
CULINARY

CULN 101. Safety and Sanitation. 3 Hours.
Sanitation and food safety practices, which are regulated by the US Food and Drug Administration and the WV Department of Health and Human Resources, food-borne illness and microorganisms, safe temperatures, health codes, and worker protection.

CULN 102. Culinary Computations. 3 Hours.
Percentages, costing, ratios, conversion factors, yield tests, and the metric system as they relate to food. Calculation of menu item selling prices, labor, payroll tax, tip credit, and other employee-related taxes. The overall concept of purchasing and receiving practices in quality food services operations. Regulations for the inspection, grading, and receipt of foods.

CULN 105. Baking Theory and Lab. 3 Hours.
PR: CULN 101 and CULN 102. Introduction to a variety of ingredients used in the baking environment. The individual components, processing, and interactions between components are discussed in relation to use in baked products. Students participate in exercises and experiments that relate to the science of baking and show the differences in baking products, ingredients, and methods of preparation.

CULN 210. Culinary Skills 1. 3 Hours.
PR: CULN 101 and CULN 102. Basic culinary skills and knowledge of food and kitchen safety; knife skills; sanitation practices; equipment identification; and a survey of raw ingredients including fruit, vegetables, starches, herbs, spices and dairy products.

ECONOMICS

ECON 201. Principles of Microeconomics. 3 Hours.
PR: Sophomore standing. Introductory microeconomics analysis. Competitive behavior of firms, price determination, efficiency in production and equity in distribution. Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

ECON 202. Principles of Macroeconomics. 3 Hours.
PR: ECON 201 or ARE 150. Introductory macroeconomics analysis, prerequisites are not enforced at WVUIT and Potomac State campuses. Aggregate demand and supply, saving, investment, the level of employment and national income determination, monetary and fiscal policy.

ECON 225. Elementary Business and Economics Statistics. 3 Hours.
PR: Sophomore standing and MATH 123 with a grade of C- or better or MATH 126 with a grade of C- or better or MATH 129 with a grade of C- or better or MATH 153 with a grade of C- or better or MATH 154 with a grade of C- or better or MATH 155 or MATH 156. Basic concepts of statistical models, distributions, probability, random variables, tests of hypotheses, confidence intervals, regression and correlation with emphasis on business and economics examples. (Equivalent to STAT 211.).

ECON 240. Introduction to Labor Unions. 3 Hours.
Structure, function and activities of labor unions and labor organizations; theories of labor organozational comparative labor movements; survey of labor and industrial relations.

ECON 301. Intermediate Micro-Economic Theory. 3 Hours.
PR: ECON 201 with a minimum grade of C-. Consumer choice and demand; price and output determination of the firm, and resource allocation, under different market structures; welfare economics, externalities, public goods, and market failure; general equilibrium; other topics.

ECON 306. History of Economic Thought. 3 Hours.
PR: ECON 201 and ECON 202. Economic ideas in perspective of historic development.

ECON 331. Money and Banking. 3 Hours.
PR: ECON 201 and ECON 202. The U.S. monetary and banking system and its functional relationship to the economic system; monetary theory and policy.

ECON 401. Managerial Economics. 3 Hours.
Cost and revenue analysis; compound interest model for profitability analysis planning working model for profitability analysis; planning working capital needs; replacement policy; inventories; working capital needs; replacement policy; inventories; linear programming; estimating demand, cost and pricing.

ECON 430. Collective Bargaining. 3 Hours.
PR: ECON 201 and ECON 202 or Consent. Union structure, administration and operation; basic theories of collective bargaining; the bargaining process, administration of agreements; wage and fringe issues in collective bargaining; institutional and administrative issues; case studies.

ECON 441. Public Economics. 3 Hours.
PR: ECON 202. Economic roles of the public sector. Particular attention to market failure, redistributing income, the financing of public sector activities, relationships between federal, state, and local governments, and public choice.

ECON 481. American Economic History. 3 Hours.

ECON 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ECON 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.
ELECTRICAL ENGINEERING

EE 200. Software Tools. 2 Hours.
PR: MATH 155. Introduction to the principal software tools used by electrical and computer engineers, including Excel, PowerPoint, Pspice, and Matlab. Students will solve real-world problems using simulation tools and report their results.

EE 221. Introduction to Electrical Engineering. 3 Hours.
PR: WVU and PSC sections require PHYS 111 and MATH 156, WVUIT sections require MATH 156. Electrical engineering units, circuit elements, circuit laws, measurement principles, mesh and node equations, network theorems, operational amplifier circuits, energy storage elements, sinusoids and phasors, sinusoidal steady state analysis, average and RMS values, and complex power. Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

EE 222. Introduction to Electrical Engineering Laboratory. 1 Hour.
CoReq: EE 221. Design and experimental exercises basic electrical circuits. Use of the digital computer to solve circuit problems. (3 hr. lab.).

EE 223. Electrical Circuits. 3 Hours.
PR: WVU and PSC sections require EE 221 and EE 222 and PHYS 112 and MATH 251 all with a grade of C- or better, WVUIT sections require EE 221 and EE 222 and MATH 251 all with a grade of C- or better. Time response of RC and RL circuits, unit step response, second order circuits, poly-phase systems, mutual inductance, complex frequency, network frequency response, two-port networks and transformers. Fourier methods and Laplace Transforms.

EE 224. Electrical Circuits Laboratory. 1 Hour.
CoReq: EE 223. Design and experimental exercises in circuits. Transient circuits, steady state AC circuits, frequency response of networks. Use of digital computer to solve circuit problems. (3 hr. lab.).

EE 311. Junior Instrumentation Lab. 1 Hour.
PR: EE 221 and EE 222. Students learn about industrial automation systems using data collection and control systems. Specific topics include PLCs (basic ladder diagrams, I/O, timers, counters, communications, and applications); measurement principles including standards, transducers, actuators, interference and noise.

EE 327. Signals and Systems 1. 3 Hours.
PR: MATH 261 and EE 223. Introduction to linear system models and solutions in the time and frequency domains. Balanced emphasis is placed on both continuous and discrete time and frequency methods. (3 hr. lec.).

EE 329. Signals and Systems 2. 3 Hours.
PR: EE 327 and (STAT 215 or MATH 448). Analysis of continuous and discrete time systems. Block diagrams, stability, feedback control. Statistical description of nondeterministic signals, correlation functions, and spectral density, concepts applied to communication and feedback systems. (3 hr. lec.).

EE 335. Electromechanical Energy Conversion and Systems. 3 Hours.
PR: WVU sections require EE 223 and EE 224 and PHYS 112, WVUIT sections require EE 223 and EE 224 and a co-requisite of EE 345. Electric energy sources, fundamentals of electromechanical energy conversion, transformers and rotating machinery.

EE 336. Electromechanical Energy Conversion and Systems Lab. 1 Hour.
Transformers, DC motors and generator performance and characteristics, synchronous machine performance and characteristics.

EE 345. Engineering Electromagnetics. 3 Hours.
PR: WVU sections require MATH 261 and PHYS 112, WVUIT sections require MATH 261 and PHYS 112 and EE 223. Continued use of vector calculus, electrostatics, magnetostatics, Maxwell’s Equations, and boundary conditions. Introduction to electromagnetic waves, transmission lines, and radiation from antennas.

EE 355. Analog Electronics. 3 Hours.
PR: EE 223 and EE 251. Electronic devices in analog circuits. Small-signal and graphical analysis of BJT and FET circuits; frequency response, feedback, and stability. Linear and nonlinear operational amplifier circuits. Power amplifiers and power control by electronic devices. (3 hr. lec.).

EE 356. Analog Electronics Laboratory. 1 Hour.
CoReq: EE 355. Design, fabrication, and measurement of analog electronic circuits. Use of discrete devices, integrated circuits, operational amplifiers, and power electronic devices. Study of biasing and stability, frequency response, filters, analog computation circuits, and power control circuits. (3 hr. lab.).

EE 400. Community Service. 0 Hours.
All BSEE students must complete 40 hours of community service. The successful BSEE student is expected to complete and evaluate service as a citizen of the local community.

EE 405. Protective Relaying. 3 Hours.
PR: EE 403. General philosophy of protective relaying-relay systems, selection of circuit breakers, classification of relays, back-up protection. Protection basics, relay coordination, CT/VT selection, relay characteristics, amplitude and phase comparators, basic design concepts. Differential, directional, over-current, impedance, admittance, reactance relays, characteristics and applications. Burden calculation protective relaying schemes for generators, transformers, busses, and transmission lines. relay coordination for radial distribution systems.
EE 411. Fundamentals of Control Systems. 3 Hours.
PR: EE 327. Introduction to classical and modern control; signal flow graphs; state-variable characterization; time-domain, root locus, and frequency
techniques; stability criteria. (3 hr. lec.).

EE 412. Automatic Control Lab. 1 Hour.
PR or CONC: EE 424. Computer-aided control design and server mechanisms. Experimentation, verification and reinforcement of automatic control
fundamentals for analysis and design.

EE 413. Introduction to Digital Control. 3 Hours.
PR: EE 327. Sampling of continuous-time signals and transform analysis. Stat-variable analysis for linear discrete-time systems and design of digital
controller. (3 hr. lec.).

EE 427. Introduction to Robotics. 3 Hours.
Basic components of robot sytems; coordinate frames, homogeneous transformations kinematics for manipulator inverse kinetics; manipulator
dynamics, Jacobian, control of manipulator and robotic programming. Project required.

EE 431. Electrical Power Distribution Systems. 3 Hours.
PR: EE 335 and EE 336 or consent. General considerations; load characteristics; subtransmission and distribution substations; primary and secondary
distribution, secondary network systems; distribution transformers; voltage regulation and application of capacitors; voltage fluctuations; protective
device coordination. (3 hr. lec.).

EE 434. Alternative Energy Resources. 3 Hours.
PR: EE 335 and EE 336. Working principles of alternative distributed energy technologies. Modeling, control, interconnection methods, and applications
of modern alternative power generation resources. Future directions of alternative energy.

EE 435. Introduction to Power Electronics. 3 Hours.
PR: EE 335 and EE 355 and EE 356 or consent. Application of power semiconductor components and devices to power system problems; power
control; conditioning processing, and switching. Course supplemented by laboratory problems. (3 hr. lec.).

EE 436. Power Systems Analysis. 3 Hours.
PR: EE 335 and EE 336. Power system network modeling, network calculations by matrices, node equations, node elimination, bus admittance,
impedance matrices, and fault calculations. Transmission line inductance, capacitance, network models, and power circle diagrams. Symmetrical and
unsymmetrical faults. Load flow and economic dispatch.

EE 445. Introduction to Antennas. 3 Hours.
PR: EE 345 or equivalent. Development of Maxwell's equations and general electromagnetic theory underlying broadcast communication systems,
wave propagation, antennas and antenna arrays.

EE 456. RF Design. 3 Hours.
PR:EE 332. Discrete an integrated components for AM, FM, and SSB circuits. High frequency analysis of BJT, FET, and MOSFET circuits. Oscillators;
mixers; power amplifiers; phone systems; modems; RF tests and measurements. Requires prototyping lab.

EE 461. Introduction to Communications Systems. 3 Hours.
PR: EE 329. Application of random processes and spectral analysis to the design and analysis of communication systems. Analysis and comparison of
standard modulation techniques relative to bandwidth, noise, threshold, and hardware constraints.

EE 463. Digital Signal Processing Fundamentals. 3 Hours.
PR: MATH 251 and EE 327. Theories, techniques, and procedure used in analysis, design, and implementation of digital and sampled data filters.
Algorithms and computer programming for software realization. Digital and sampled data realizations, switched capacitor and charge-coupled device
IC's. (3 hr. lec.).

EE 480. Senior Design Seminar. 0-3 Hours.
PR: ENGL 102 or consent. Penultimate semester. Group senior design projects with individual design assignments appropriate to student's discipline.
Complete system-level designs of the subsequent semester's project presented in written proposals and oral presentations. (Equivalent to BIOM 480,
CPE 480, CS 480) (2 hr. lec., 1 hr. conf.) Note: WVU Tech course is 3 credit hours.

EE 481. Senior Design Project. 3 Hours.
PR: EE 480; Continuation of EE 480. Detailed design and implementation of the system including choice of components, algorithm development,
interfacing, trouble shooting, working in groups, and project management. Also covers professional topics, including ethics, liability, safety, socio-legal
issues, risks and employment agreements. (1 hr. lec., 1 hr. conf., 2 hr. lab.).

EE 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ELECTRONIC ENGINEERING TECHNOLOGY

ELET 315. Electronic Measurement and Instrumentation. 4 Hours.
PR:MATH 117 or Consent. The application of electrical and electronic circuits-including discrete, integrated, linear, and digital components-to
instruments used to measure and record physical quantities. Introduction to theory, units a and error analysis in the measurement of physical
parameters. Also covered are noise reduction, communication circuits, interface topics, and troubleshooting techniques.
ELET 337. Communication Systems 2. 4 Hours.
PR:MATH 315 and Jr status or Consent. An introduction to digital modulation techniques, error detection/correction, and communication systems, Analog and digital voice and data transmission, copper and fiber optic transmission media, and network (LAN/WAN) topology and protocols. Use of computer circuit analysis, simulation software such as Microsim Pspice, MATLAB, SysView, or Electronics Workbench.

ELET 375. Power Systems and Industrial Devices. 4 Hours.
A study of polyphase industrial and commercial power utilization. This course cover polyphase AC motors; DC motors and generators; transformers, including sizing, testing, winding connections, efficiency and voltage regulation; industrial motor controllers and protective devices; lighting system design principles and practices; conductor insulation classifications; and National Electric Code. Students are required to complete a design project as part of the final grade. The project includes a formal report and oral presentation.

ELET 410. Control Systems Technology. 3 Hours.
PR:MATH 315 A study of continuous control systems in open and closed loop. Transfer functions in the frequency domain and the system's time domain response are included. Components including op-amps, potentiometers, synchros, motors, amplifiers, tachometers and transducers; and the industrial control process concepts and systems are covered. The emphasis is on closed-loop feedback systems, system characteristics, and stability analysis. The use of the microcomputer in system control, system analysis, and simulation is introduced.

ELET 420. Microprocessors and Digital Systems. 4 Hours.
This course covers such topics as analog/digital and digital/analog circuits. It emphasizes circuit minimization techniques such as Karnaugh mapping, variable entered maps, and the Quine McCluskey Method. Other areas explored include LSI circuits, such as multiplexers and demultiplexers, decoders, and memory devices. The course also includes an introduction to state machine design. Characteristics of logic families are covered. The final one-third of the course is an introduction to microprocessor architecture.

ELET 426. Microprocessor-Based Data Acquisition and Control. 4 Hours. 
PR:ELET 410 and ELET 420 or Consent. Introduction to microprocessors, microcontrollers, and data acquisition and control topics. The application of assembly language programming is covered. Application of Intel 8051 family microcontrollers are introduced and several hardware applications including memory interfacing, timing considerations, and serial I/O are investigated through lab exercises. PC based data acquisition boards and high level visual programming environments are introduced through lab exercises.

ELET 436. Programmable Logic Controllers. 4 Hours.
PR:Jr status A study of PLC's and their applications to factory automation and industrial control. Includes laboratory experience with programming in ladder logic and hard-writing PLC's to external devices.

ELET 493. Special Topics. 1-6 Hours.
Investigation of topics not covered in regularly scheduled courses.

ELET 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

ENGINEERING

ENGR 101. Engineering Problem Solving 1. 2 Hours.
PR or CONC: MATH 154 or MATH 155. Engineering problem solving methodologies and analysis. Use of computers in problem solving, technical report writing, team based project work and presentations.

ENGR 111. Software Tools for Engineers. 3 Hours.
PR or CONC:MATH 125 or MATH 126 and MATH 128. Use of software tools such as spreadsheets, numerical and symbolic mathematical analysis packages. Study of programming concepts and techniques. Preparation of graphs, interpolation and curve fitting, numerical integration and differentiation, and solution of linear and non-linear simultaneous equations. Emphasis is on the application of numerical methods and software applications. Laboratory practice is required.

ENGR 401. Senior Engineering Seminar. 1 Hour.
PR:Senior status Ethics and professionalism, engineering safety, copyright and liability issues. Citizenship, role of the engineer in Society, current issues in engineering, ecological considerations and impact of globalization.

ENGR 402. Fundamentals of Engineering Review. 2 Hours.
PR:Senior standing. This course provides information and review materials for students planning to take the Fundamentals of Engineering (FE) exam. This course requires prior knowledge of the subject matter and will concentrate on problem solving and review. Basic concepts will be referenced, but will be explained only where the majority of students lack earlier exposure to the material. The topics included are statics, dynamics, mechanics of materials, fluid mechanics, mathematics, probability and statistics, chemistry, engineering economics, electricity and magnetism, material properties, thermodynamics, computers, and ethics and business practices.

ENGR 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.
ENGINEERING TECHNOLOGY

GNET 308. Advanced Computer Applications. 3 Hours.
PR: MATH 117 or Consent. This course uses personal computers to select topics in advanced problem solving methodologies found in technology fields. Students will learn to use selected advanced computer applications software or programming languages in solving problems in technical calculus, statistics, graphics, matrices, complex variables, robotics, and advanced topics in engineering technology fields. Software or language selection in the technology fields will be based upon current developments in technology so that students will have an introductory exposure to some of the newest application tools.

GNET 410. C++ Programming for Technology. 3 Hours.
PR: Jr status or Consent. Emphasis on using C++ programming language in solving technology problems. Topics include the C environment, structured programming, technical calculations and functions, relational and logical operation, branches, loops, arrays and file creation.

GNET 412. Project Management. 3 Hours.
PR: Jr standing. The primary focus of this course is the analysis and management techniques used to implement a successful project. Topics include: project planning, project scheduling and staffing, and project control; administration, economic analysis, and reporting procedures; and material and labor cost estimating. Project management software will be introduced, a project will be analyzed, and an in-depth project report will be generated and presented.

GNET 489. Senior Seminar and Project. 2 Hours.
PR: Senior status. Seminar on topics relating to improving processes, design, teamwork, problem solving, communication skills, lifelong learning, professional and ethical issues, total quality, time management, and continuous improvement. Final project aimed at combining the skills and knowledge gained from the various areas of study in the student’s field. The student will be expected to report graphically, orally and in written form on a final project approved by a departmental advisor. Presentations will be made to a representative board of the faculty.

GNET 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

ENGINEERING TECHNOLOGY - CIVIL

CIET 320. Construction Methods and Equipment. 3 Hours.
PR: Jr status or consent. Study of the methods used in civil engineering construction and the management of equipment that relates to these methods. Topics include earthwork, roads, pipelines, foundations and construction in concrete, masonry, steel, and timber. The course will be supplemented by organized field trips to construction sites.

CIET 325. Codes, Contracts, and Cost Analysis. 3 Hours.
PR: Jr status. Construction planning. Economics and time value of money, use of interest formulas, inflation, depreciation, construction documents; construction contract administration; professional ethics; construction scheduling using Grantt charts, critical path and PERT. Use of industry-standard software for planning and scheduling.

CIET 330. Computer Applications in Hydraulics and Hydrology. 3 Hours.
Review of principles of hydraulics and hydrology; hydraulic calculations using Flowmaster; and storm sewer design using StormCAD. Use of other industry-standard software for water resources applications with emphasis on Haestad Methods.

CIET 355. Construction Estimating. 3 Hours.
This course is intended to provide students with the ability to estimate the cost of the various activities that constitute a construction project. Issues to be considered include contact documents, the bid-award process, types of estimates, breakdown of project, elements of the estimate, quantity take off techniques, estimating labor, material and equipment costs, use of experience tables and databases, adjustments for overhead, profit and contingencies, assembling the estimate. Considerate use will be made of spreadsheets and an industry-standard estimating computer software package.

CIET 382. Environmental Engineering Technology. 3 Hours.
PR: Jr status. This subject deals water and air quality, stream pollution; purification of water, treatment and disposal of municipal wastewater; aspects of municipal solid waste and hazardous waste management; and environmental regulations and impact. Included are routine environmental calculations and elements of design of treatment and pollution control systems. Basic lab and field tests and sampling techniques are also covered. Numerous field trips are included.

CIET 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

ENGINEERING TECHNOLOGY - MECHANICAL

MEET 316. Dynamics. 3 Hours.
PR: MATH 117. A study of mass moment of inertia; rectilinear, angular, and planar motion; work, energy, and power; and impulse and momentum as applied to technology.
MEET 435. Energy Conversion Systems. 3 Hours.
PR: MATH 117 and PHYS 201 and Jr status or Consent. An introduction to energy conversion through a study of thermal heat and power. Fundamental thermodynamic processes, cycles, and systems will be covered. Applications studied will include electric power generation, internal combustion engines, material science, refrigeration, and air conditioning processes.

MEET 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

MEET 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

ENGLISH

ENGL 101. Introduction to Composition and Rhetoric. 3 Hours.
Studies the logical, rhetorical, and linguistic structures of expository prose; develops strategies for analyzing purposes, audiences, and conventions; emphasizes processes for drafting, revising, and editing. Required of all bachelor's degree candidates unless equivalent transfer credit or portfolio credit applies. Qualified students may complete ENGL 103 in place of ENGL 101 and 102. Co-requisites will differ at WVUIT and PSC.

ENGL 102. Composition, Rhetoric, and Research. 3 Hours.
PR: ENGL 101 or equiv. Builds on the writing abilities earned in English 101 (or the equivalent). Focuses on the research process, argumentation, and critical inquiry; emphasizes structures, language, documentation, and formats appropriate for specific audiences and purposes. Required of all bachelor's degree candidates unless equivalent transfer credit or portfolio credit applies.

ENGL 111. Introduction to Creative Writing. 3 Hours.
Instruction in reading and writing fiction, nonfiction and poetry in order to enhance creative writing skills.

ENGL 131. Poetry and Drama. 3 Hours.
An introduction to the genres.

ENGL 132. Short Story and Novel. 3 Hours.
An introduction to the genres.

ENGL 212. Creative Writing: Fiction. 3 Hours.
An open enrollment introduction to the writing of fiction.

ENGL 221. The English Language. 3 Hours.

ENGL 225. Western World Literature. 3 Hours.
Selected readings in the canon of Western world literature, both ancient and modern.

ENGL 236. The Bible as Literature. 3 Hours.
Analysis of the themes, topics and literary genres of the Old and New Testaments. Issues to be discussed include the unity of the text, the status of authorship, translation, and the depiction of God.

ENGL 241. American Literature 1. 3 Hours.
A historical introduction and survey from its beginnings to the mid-nineteenth century.

ENGL 242. American Literature 2. 3 Hours.
A historical introduction and survey from the mid-nineteenth century to the present.

ENGL 252. Appalachian Fiction. 3 Hours.
Reading of short stories, novels, and other narratives by Appalachian authors.

ENGL 258. Popular American Culture. 3 Hours.
A survey of modern popular American culture from 1940 to the present, with special emphasis on popular literature, music, television, movies, radio in its golden age, and comic books.

ENGL 261. British Literature 1. 3 Hours.
A historical introduction and survey from the Middle Ages through the eighteenth century.
ENGL 262. British Literature 2. 3 Hours.
A historical introduction and survey from the late eighteenth century to the present.

ENGL 263. Shakespeare 1. 3 Hours.
Several of Shakespeare's most important plays.

ENGL 272. Modern Literature. 3 Hours.
British and American poetry, drama, and fiction from 1900 to 1960.

ENGL 301. Writing Theory and Practice. 3 Hours.
PR: (ENGL 101 and ENGL 102) or ENGL 103. Tradition and contemporary approaches to rhetoric and writing theory for professional writing and editing students who wish to develop their abilities to analyze and produce written texts.

ENGL 302. Editing. 3 Hours.
A comprehensive approach to editing, including the correctness and effectiveness of a document, information design, and editorial responsibility. Students gain a realistic perspective on workplace practice through real-world scenarios, case studies, and technological applications.

ENGL 303. Multimedia Writing. 3 Hours.
Study of communication and design issues in multimedia composition. Focuses on communication, creative expression, persuasion, interactivity, and rhetorical principles. Practice in composing multimedia documents such as online publications, interactive literary works, and tutorials.

ENGL 304. Business and Professional Writing. 3 Hours.
PR: (ENGL 101 and ENGL 102) or ENGL 103. Students will analyze different writing contexts, meet the needs of different audiences, and organize and present material in letters, memos, and reports. Includes some research, Internet components, and a review of style, grammar and usage.

ENGL 305. Technical Writing. 3 Hours.
PR: (ENGL 101 and ENGL 102) or ENGL 103. Writing in scientific and technical fields. Introduces students to typical genres, workplace practices, document design, and conventions of writing for experts and non-experts.

ENGL 306. Topics in Humanities Computing. 3 Hours.
Topics include: literary studies (electronic publications, web-based interactive fiction, poetry, drama, nonfiction), creative writing in digital media, composition online, pedagogy, cultural studies of electronic media, online communications, language studies. Topics rotate; check with the instructor for current topic.

ENGL 321. History of the English Language. 3 Hours.
PR: ENGL 221 or LING 101 or LING 311 or instructor's permission. Study of the nature of the language; questions of origins, language families, development, relationships of English as one of the Indo-European languages.

ENGL 331. Topics in Genre. 3 Hours.
This variable-topic course will trace formal and thematic conventions in poetry, drama, prose, fiction, and/or nonfiction.

ENGL 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

EXERCISE PHYSIOLOGY

EXPH 364. Kinesiology. 3 Hours.
PR: MATH 126A or MATH 126B or MATH 126C or MATH 129 or (ACT math score of 26 or SAT math score of 580 and (QRA Part 1 score of 15 and QRA Part 2 score of 9)) and sophomore standing or consent. Anatomical, mechanical, and musculoskeletal study of the human body as the instrument for efficient performance of motor activities. (Laboratory work included.).

EXPH 365. Exercise Physiology 1. 3 Hours.
PR: Junior standing or consent. The study of the functioning of body systems during exercise and the acute and chronic adaptations that occur from exercise stress.

FINANCE

FIN 310. Investments. 3 Hours.
PR: (BCOR 340 or FIN 325) with a minimum grade of B- and PR or CONC: FIN 330. Investment analysis and management for the individual and the financial institution.

FIN 321. Personal Finance. 3 Hours.
Issues concerning the management of personal wealth. Topics include: personal financial statements, records; budgeting; personal income taxes; consumerism; use of credit; housing real estate; and insurance; investment; and retirement planning.

FIN 325. Financial Management 1. 3 Hours.

FIN 326. Financial Management 2. 3 Hours.
PR: FIN 325 and MANG 386. Continues the discussion of fundamental of financial management begun in FIN 325. Management of working capital; international finance; cost of capital; financial leverage; long-term finance. Use is made of the case studies method.
FORENSIC INVESTIGATION

FRNX 101. Introduction to Forensic Investigation. 3 Hours.
Covers the history, organization, and functions of Forensic Investigation organizations; how disciplines of science produce evidence; and science's role in the courtroom. Introduces types of crime scenes and how they are processed.

FRNX 201. Fingerprint Evidence Analysis. 4 Hours.
Explores the collection, classification, and comparison of friction-ridge skin prints; the application of probability in decision-making; and photographic and chemical-processing techniques applied to the recovery of latent friction-ridge detail.

FRNX 212. Advanced Fingerprint Evidence. 3 Hours.
FRNX 212. Advanced Fingerprint Evidence. 3-Hr. The identification of unknown to known impressions ranging from easy to extremely difficult; ways latent prints can be distorted, smart searching protocols, and a deeper understanding of the formation of friction ridge skin.

FRNX 224. Automated Fingerprint Identification Systems. 3 Hours.
Introduction to Automated Fingerprint Identification Systems (AFIS). AFIS is used in the criminal justice system nationwide. 10-print entry and latent fingerprint entry will be conducted on a daily basis.

FRNX 300. Investigative Photography. 3 Hours.
FRNX 301. Investigative Photography. 3-Hr. Covers nomenclature and operation of photographic equipment, with emphasis on lighting, exposure, depth of field, motion-blur and image composition. The use of alternate light sources, crime scene, macro and surveillance photography are highlighted.

FRNX 310. Firearms and Tool Marks. 3 Hours.
Explores analysis of impression evidence including odontological, tool marks, foot and tread wear, tire tracks, and firearm-related impression evidence. Includes techniques for evaluating projectile trajectories as well as explosive evidence and post blast scenarios.

FRNX 311. Trace and Blood Spatter. 3 Hours.
Covers various types of trace evidence and its collection, preservation, and evaluation; covers bloodstain pattern analysis for incident reconstruction.

FRNX 312. Digital Evidence Protocols. 3 Hours.
FRNX 312. Digital Evidence Protocols. 3-Hr. Introduces digital investigations and the acquisition and analysis of digital evidence. Topics include: computer investigations practices, process, working with common computer software and disk structures, current computer tools, and digital evidence controls.

FRNX 314. Questioned Documents. 3 Hours.
Theories and principles of the creation, duplication and alteration of written and printed materials. Overview of the methods used to identify the varying elements of printed materials including papers, inks, and creation processes.

FRNX 315. Interviewing Theory. 3 Hours.
Covers interviewing theories and techniques to determine emotional states from speech and body language, build rapport, prevent contamination, increase recall, and reduce the risk of false confessions.

FRNX 316. Death Investigation. 3 Hours.
FRNX 316. Death Investigation. 3-Hr. Topics include the homicide crime scene, preliminary investigations, scene documentation, estimating time of death, identity of remains, death notification, modes of death, suicides, sex narcotics related homicides, evidence collection, autopsy, and news media.

FRNX 318. Crime Scenes. 3 Hours.
FRNX 318. Crime Scenes. 3-Hr. Examines concepts, field-tested techniques and procedures, and technical information concerning crime scene investigation. Focuses on initial responding officer and duties of the investigator on various types of crime scenes.

FRNX 324. Forensic Anthropology and Osteology. 3 Hours.
FRNX 324. Forensic Anthropology and Osteology. 3-Hr. Includes background in forensic anthropology, most often associated with the analysis of skeletonized human remains and guidelines for determining when to include and how to choose a forensic anthropologist in death investigations.

FRNX 326. Investigative Intelligence. 3 Hours.
FRNX 326. Investigative Intelligence. 3-Hr. This information provides a survey of intelligence techniques for protecting information (counter-intelligence), obtaining information, and analyzing raw information. The impact on public policy and the ethics of intelligence gathering are also covered.

FRNX 327. Sexual Assault Investigations. 3 Hours.
FRNX 327. Sexual Assault Investigations. 3-Hr. Explores the role of sexual assault investigation. Includes the history of society's response to sex crimes, investigation techniques, forensic applications, offender typologies and victim studies, legal procedures and judicial decisions, and expert testimony.

FRNX 422. Cold Case Investigations. 3 Hours.
FRNX 422. Cold Case Investigations. 3-Hr. Provides an opportunity to work with a local law enforcement agency in re-examining an old case using modern technology. Students should be prepared to travel to crime scene locations and the offices of regional law-enforcement.

FRNX 484. Senior Seminar in Forensic Investigation. 3 Hours.
An in-depth analysis of problems and issues in the forensics. Identifies areas for development within a student's forensic education. Includes career and graduate school planning, portfolio, resume, and interview skills.
FRNX 496. Senior Thesis. 1-3 Hours.
PR: Consent.

**GEOGRAPHY**

**GEOG 102. World Regions. 3 Hours.**
Comparison and relationships of world regions. Geographical perspectives of contemporary global problems. Developing regions contrasted with modernized regions and the consequences of their interactions.

**GEOG 108. Human Geography. 3 Hours.**
Introduction to geographical dimension in human behavior and the human altered landscape including social, demographic, economic, and political attributes of societies.

**GEOG 240. United States and Canada. 3 Hours.**
Regional study of the United States and Canada emphasizing such geographic features as climate, natural vegetation, topography, natural resources, population distribution and trends, agriculture, manufacturing, transportation systems, and regional culture.

**GEOLOGY**

**GEOL 312. Geology. 3 Hours.**
An examination of the earth from its beginning as a planet in the solar system to its present day structure. The course is chiefly concerned with the composition, character and architecture of the earth's crust and with the agencies and processes which are continually altering it. Includes laboratory experience in mineralogy, petrology and mapping and a one-day field trip.

**HEALTH SCIENCE**

**HLSC 104. Nutrition. 3 Hours.**
The study of normal and therapeutic nutrition and its implications in health care across the lifespan. Principles of normal nutritional needs of infants, children, adolescents, pregnant, and lactating women, and other adults are studied in relation to the nutrients as provided by the basic four food groups.

**HISTORY**

**HIST 105. The Middle East. 3 Hours.**
History of the Middle East from the rise of Islam (610 C.E.) to Twentieth Century. Special attention given to religion, gender issues, political developments, economic problems, relations with the West, cultural patterns and changes in the modern era.

**HIST 152. Growth of the American Nation to 1865. 3 Hours.**
(HIST 152 does not have to precede HIST 153.) Examines the basic political, economic, and social forces in formation and development of the United States before 1865. Emphasis on national development from independence through the Civil War.

**HIST 153. Making of Modern America: 1865 to the Present. 3 Hours.**
(HIST 153 may precede HIST 152.) Continues the examination of basic political, economic, and social forces in the development of the United States since the Civil War.

**HIST 179. World History to 1500. 3 Hours.**
Comparative history of Africa, Asia, and Europe from earliest times until 1500. Political, economic, social, and religious developments with emphasis on patterns of authority, the individual, nature, and society.

**HIST 180. World History Since 1500. 0-3 Hours.**
Comparative history of Africa, Asia, and Europe 1500 to the present. Political, economic, and social developments with emphasis on patterns of authority, the individual, nature, society, and the impact of the West.

**HIST 203. Introduction to Medieval Europe. 3 Hours.**
Treats the emergence of the distinctive culture of Western Europe from the Fall of Rome to the Renaissance, considering the transformation and interaction of politics, economics, society, religion, and ideas.

**HIST 261. Recent America: The United States since 1918. 3 Hours.**
(Primarily for non-History majors.) The 1920's, the New Deal, World War II, and a survey of developments since World War II.

**HIST 277. Revolutions in Science and Technology. 3 Hours.**
Examines particular periods of intensified change in science and technology, to develop general understanding of scientific and technical change. Episodes may include the Scientific, Industrial, Darwinian, or other revolutions.

**HIST 293. Special Topics. 1-6 Hours.**
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

**HIST 300. Greece and Rome. 3 Hours.**
Covers the Minoan and Mycenaean civilizations, Archaic and Classical Greece, Alexander the great and the Hellenistic Age, the Roman Republic, the Etruscan and Carthaginian states, and the rise of the Roman Empire.
HIST 367. History of England. 3 Hours.
England under Celtic, Roman, and Anglo-Saxon rule; the Norman conquests, the Tudor Monarchy; Elizabethan and Stuart England; England in the Age of the American and French Revolutions; Nineteenth-Century England; England in World War I; England in World War II; the decline of England as a world power.

HIST 375. Hollywood and History. 3 Hours.
Examines twentieth century American culture, politics, and society through film. It explores the relationship between film and history using films as primary sources for understanding the past.

HIST 393. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

HIST 424. Britain 1455-1603. 3 Hours.
England from Richard II to Elizabeth I, covering developments in politics, religion and society, ranging from the War of the Roses and the plague to Protestantism and Shakespeare.

HIST 453. Civil War and Reconstruction. 3 Hours.
Causes as well as constitutional and diplomatic aspects of the Civil War; the role of American black in slavery, in war, and in freedom; and the economic and political aspects of Congressional Reconstruction.

HIST 473. Appalachian Regional History. 3 Hours.
Historical survey of Central Appalachia's three phases of development: traditional society of the nineteenth century, the transformation of a mountain society by industrialization at the turn of the twentieth century, and contemporary Appalachia.

HIST 484. Historical Research-Capstone. 3 Hours.
PR: History major or consent. Capstone course which introduces historical research techniques. Completion and presentation of major research paper required.

HIST 495. Independent Study. 1-6 Hours.
HIST 495. Independent Study. 1-6 hr. Faculty supervised study of topics not available through regular course offerings.

HUMAN SERVICES

HUMS 100. Community Service. 1-3 Hours.
Arranged field placement in community service. Work hours will vary by credit and project.

HUMS 210. Introduction to Welfare. 3 Hours.
A basic course in work that includes an introduction to the concept of welfare history of welfare in the U.S., instutional aspects of welfare, basic work methods, and some techniques of community organization.

HUMS 300. Introduction to Health Care Organizations. 3 Hours.
An examination of the broad institutional and organizational components of the health care field with concentration on hospitals, nursing homes, health departments, and alternative delivery organizations. The role of both the physician and the health care manager in influencing the delivery of health care will be emphasized. Basic factors determining the cost and planning of health care will be considered.

HUMS 320. Public Administration. 3 Hours.
Concepts of public administration, including organizational theory, organizational authority and communications, personnel and financial administration, administrative responsibility in the public sector.

HUMS 330. Health Insurance. 3 Hours.
Institutions, laws, and public policy dimensions of health care insurance in America with a focus on health and insurance, the payment network, comparative systems and alternate delivery, and public policy.

HUMS 400. Health Services Law and Legislation. 3 Hours.
Recognition and comprehension of areas of legal liability in hospital activities; knowledge and familiarity with a wide variety of administrative duties and responsibilities of a nature, such as administrative investigations, misconduct and line-of-duty determinations, claims under the Medical Care Recovery Act, Federal Tort Claims Act, and other related matters.

HUMS 410. Fundamentals of Health Care Administration. 3 Hours.
Principles of modern health care administration, planning, organizing, directing, and controlling in health services management; contemporary issues in health care administration.

HUMS 420. Principle of Microhealthcare Finance. 3 Hours.
A critical study of healthcare finance at the department and sub-department level. The course will continue the study of financial information, decision making in the health care environment, processing mapping, capital and operational budgeting. Students will also be exposed to federal, state and local healthcare finance laws, rules and regulations.

HUMS 421. Principles of Macrohealth Care Finance. 3 Hours.
The nature of financial information and the decision making process in the health care industry; the financial environment in health care organizations; trends in reimbursement systems; cost concepts, financial analyses, capital formation and project analysis.
HUMS 430. Medical Ethics. 3 Hours.
Philosophical and sociological investigation of complex moral problems in medicine and healthcare delivery, topics include euthanasia, abortion, allocation of scarce medical responses, accessibility problems, AIDS, research and human experimentation, among others.

HUMS 440. Long Term Care Administration. 3 Hours.
PR: HUMS 300 or Consent. The purpose of this course is to acquaint students pursuing a career in health care management with the dynamic and increasingly important field of long term care. The course provides a comprehensive overview of programs, policies, and services and examines the issues, challenges and dilemmas confronting long term care management and others in the field of health services. Long term care includes; skilled nursing facilities, assisted living, home health care, adult day care (both the social and the medical models), hospice, and a view of continuous care retirement facilities.

HUMS 460. Readings and Research in Health Services Administration. 1-3 Hours.
Directed readings and research in health services administration.

HUMS 470. Health Services Planning. 3 Hours.
Introduction to the history and development of health planning; introductory overview of planning techniques and familiarity with general quantitative methodology; legal, political, and economic factors in health care planning with emphasis on policy formulation and implementation.

HUMS 480. Grant Writing and Documentation. 3 Hours.
Specialized course providing students with the knowledge and skills necessary to write grants that are based upon clearly defined needs analysis and project goals. Researching possible funding and sources, indentifying goals and objectives, developing a program evaluation and time-line for a mock proposal will provide the students with real-life grant writing experience.

HUMS 489. Practicum Capstone Internship. 3-12 Hours.
Observation, participation and hands-on experience in a suitable agency. The organization chosen for each individual will depend upon the occupational goals of the student. The selected facility will have a qualified administrator to enhance student learning opportunities. 75 work hours for each 3 hours of credit minimum and more is recommended.

HUMS 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

HUMS 494. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

INDUSTRIAL TECHNOLOGY

INDT 302. Industrial Safety. 3 Hours.
Topics covered in this course will include: manual handling and material storage; mechanical injuries; industrial environmental hazards - solvents, particulates, noise, radiation, toxicology, and ergonomics, etc.; monitoring instruments; protective devices industrial hygiene programs and safety practice in the use of basic hand and machine tools, with reference to OSHA, and other regulatory safety regulations.

INDT 308. Automated Manufacturing. 3 Hours.
PR: MATH 114 or Consent. Principles, techniques, and applicaitons of Numerical Control CNC programming utilizing CAD/CAM, automated methods of material handling, manufacture, assembly, inspection/testing and material processing. Field trips may be included.

INDT 354. Industrial Materials. 3 Hours.
Introduction to types of materials-metals, ceramics, polymers, composites, and semiconductors; environmental degradation of materials, and material selection.

INDT 384. Robotics 1. 3 Hours.
PR: Jr Status. Fundamental concepts of industrial robotics; manipulator control, sensor systems, microcomputer control schemes, robot geometry and configuration, path control, multi-axis dynamics.

INDT 410. Plant Equipment and Maintenance. 3 Hours.
PR: MATH 113 and MATH 114 or Consent. A study of various manufacturing equipment, maintenance planning, scheduling, staffing, training, and resource management for maintenance requirements in industrial/educational facilities. Field trips may be included.

INDT 420. Construction Technology. 3 Hours.
PR: INDT 354 or Consent. A broad coverage of current and standard methods of construction using wood, steel, masonry, and concrete. Requirements for energy efficiency of heating, plumbing and air conditioning are included. Emphasis is on residential, light commercial, and industrial construction.

INDT 484. Robotics 2. 4 Hours.
PR: INDT 384. Advanced concepts of industrial robots; survey of robotic components, systems and manufacturers, robot work areas, material logistics, implementation considerations, future robotic considerations.

INDT 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.
INFORMATION SYSTEMS

ISYS 101. Introduction to Information Systems 1. 3 Hours.
An Introduction to the concepts of computer organization, system software, programming languages, computer security, networking, and database management. The other topics include history of computing, Boolean logic, and computer ethics.

ISYS 102. Introduction to Information Systems 2. 3 Hours.
ISYS 102. Introduction to Information Systems 2. 3 hours. Introduction to the programming process, including program design tools, coding, and debugging. Design and implementation of programs and projects for business applications in Visual Basic.

ISYS 115. Discrete Structures. 3 Hours.
ISYS 115. Discrete Structures. 3 hours. PR: MATH 150. An introduction to discrete mathematics as it is used in computer science. Topics include functions, relations, sets, propositional and predicate logic, simple circuit logic, proof techniques, elementary combinatorics, and discrete probability.

ISYS 270. Linux. 3 Hours.
ISYS 270. Linux. 3 hours. PR: CS 122. An introduction to Linux programming, including shell scripting; the Linux file system; packaging software; process and thread creation; process and thread synchronization with semaphores and mutexes; interprocess communication with pipes; and programming sockets.

ISYS 325. C#. 3 Hours.
ISYS 325. C#. 3 hours. PR: C or better in CS 122. This course provides students with the necessary skills for developing applications using C# within Microsoft Visual Studio.NET environment focusing on object oriented design, program structure and implementation guidelines for developing applications.

ISYS 366. e-Commerce. 3 Hours.
ISYS 366. e-Commerce. 3 hours. PR: CS 324 and ISYS 325. The essentials of design and creation of data driven e-commerce websites associated with complex databases. Upon completion, a student will have built a data driven commercial website similar to amazon.com in both ASP and php.

JOURNALISM

JRL 101. Media and Society. 3 Hours.
Examines the relationship between media, culture and society, with emphasis on the history, structure, and organization of the mass media.

MANAGEMENT

MANG 310. Management of Small Business. 3 Hours.
PR: BCOR 370. Focusing on the management of small business, the course is designed both for those seeking employment in small business, and for those entering large organizations which deal with small firms as suppliers, customers, and competitors.

MANG 330. Human Resource Management Fundamentals. 3 Hours.
PR: BCOR 370. Fundamental principles and practices related to the procurement, development, maintenance, and utilization of human resources. Focus on areas such as human resource planning, selection training, performance appraisals, compensation, safety and health and labor relations.

MANG 350. Leadership In Business. 3 Hours.
Investigation of human dimension in organization to include individual and group behaviors and organizational culture. Investigation and analysis of contemporary leadership thought and research as related to organizational operation.

MANG 360. International Business. 3 Hours.
PR: BCOR 370. The course explores the cultural, economic, and political environments of business. Other topics include globalization, import and export, foreign direct investment, foreign currency exchange, regional economic cooperation, and the multinational enterprise.

MANG 375. Business Simulation. 3 Hours.
PR: ACCT 331 and BCOR 350 and BCOR 370 and FIN 325. Business games that provide students with simulated real-world managerial decision-making experiences. The simulation provides students with the opportunities to make decisions that cross over functional lines.

MANG 386. Business Statistics. 3 Hours.
PR: MATH 124 and BCOR 370. Elementary principles of collecting and presenting statistical data; frequency distribution; grouping averages; dispersion and skewness; sampling processes; statistical inference; simple correlation; series analysis.

MANG 420. Business Information Systems. 3 Hours.
PR: BCOR 330 and BCOR 370. Use of EDP for decision making with emphasis on application in the functions of finance, marketing, personnel, accounting, and operations management.

MANG 422. The Individual and the Organization. 3 Hours.
PR: BCOR 370. Examination of how the individual, the group, and the organization interact to influence the behavior of the business organization and that of its human resources.

MANG 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 6 hours). Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.
MARKETING

MKTG 315. Buyer Behavior. 3 Hours.
PR: BCOR 350 with a minimum grade of C-. The buyer decision process in a marketing framework. Emphasis on psychological and sociological concepts which influence the decision process.

MKTG 325. Marketing Research. 3 Hours.
PR: MKTG 315 with a minimum grade of C-. Scientific approach to the solution of marketing problems with emphasis on research methods and techniques.

MKTG 380. Integrated Promotions. 3 Hours.
PR: BCOR 350 with a grade of C- or higher. Marketing promotions can dramatically influence the relative success of firms and their brands. As such, we seek to understand the processes and approaches that organizations use in developing and sustaining effective promotional strategies.

MKTG 410. Retail Management. 3 Hours.
PR: BCOR 350 and MKTG 315 with a grade of C- or higher. The organization and operating environment of retail firms. Special emphasis placed on consumer market segmentation and the marketing variables of merchandise mix, effective pricing, store location, and communication with suppliers and consumers.

MKTG 420. Sales Management. 3 Hours.
PR: MKTG 320 with a grade of C- or higher. Concentrates on the managerial responsibilities of sales manager for directing, motivating, and controlling a sales force plus the techniques of selling, including objections and closing.

MKTG 485. Global Marketing. 3 Hours.
PR: MKTG 325 and MKTG 350 with a minimum grade of C- in each. Evaluation and analysis of marketing strategies in a global environment, examination of the relationship between international buyer behavior and the elements of the marketing mix.

MATHEMATICS

MATH 121. Intro Concepts Of Mathematics. 3 Hours.
(Designed for non-science majors who do not need the techniques of mathematics for other course work in their programs.) Topics in modern mathematics.

MATH 122. Quantitative Skills and Reasoning. 2 Hours.
PR: Minimum HEPC-defined ACT/SAT Math or equivalent assessment score, or satisfactory performance on placement test. An introductory study of quantitative and reasoning skills needed for success in science, technology, engineering, and mathematics.

MATH 123. Finite Mathematics 1. 3 Hours.
PR: MATH 93 or one unit of high school algebra and ACT math score of 19 or higher. Fundamentals of algebra; functions and graphs; linear functions; introduction to exponential and logarithmic functions; solving linear and quadratic equations; matrices.

MATH 124. College Algebra with Applications. 3 Hours.
PR: Satisfactory performance on departmental placement test; or satisfy the minimum ACT/SAT Math score; or a grade of C or better in MATH 122. Study of college algebra with an emphasis on applications for science, business, technology, and social science. Topics include graphing and solving problems using linear, quadratic, square-root, logarithmic, and exponential functions, solving equations, performing operations on matrices, and linear programing.

MATH 126A. College Algebra 5-Day. 3 Hours.
PR: Satisfy the minimum ACT/SAT math score, or satisfactory performance on departmental placement examination, or C- in MATH 122. (This course is not open to students who have credit for MATH 129 or its equivalent.) Review of the real number system and algebraic expressions, equations, inequalities, graphing, functions, and polynomials. Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

MATH 126B. College Algebra 4-Day. 3 Hours.
PR: Satisfy the minimum ACT/SAT math score, or satisfactory performance on departmental placement examination, or MATH 122 with a minimum grade of C-. (This course is not open to students who have credit for MATH 129 or its equivalent.) Review of the real number system and algebraic expressions, equations, inequalities, graphing, functions, and polynomials. Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

MATH 126C. College Algebra 3-Day. 3 Hours.
PR: Two units of algebra, one unit of geometry, and satisfactory performance on departmental placement examination or successful completion of the pre-college algebra workshop or its equivalent. (This course is not open to students who have credit for MATH 129 or its equivalent.) Review of the real number system and algebraic expressions, equations, inequalities, graphing, functions, and polynomials. Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

MATH 128. Plane Trigonometry. 3 Hours.
PR: A minimum grade of C- in MATH 126A or MATH 126B or MATH 126C. (This course is not open to students who have credit for MATH 129 or equivalent.) Trigonometric functions, identities, vectors, complex numbers, and trigonometric equations. Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.
MATH 129. Pre-Calculus Mathematics. 4 Hours.
PR: Satisfy the minimum ACT/SAT math score, or satisfactory performance on departmental placement test, or B- in MATH 126B. Not open to students who have credit for the equivalent of either MATH 126 or 128. A treatment of algebra, analytic geometry, and trigonometry. Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

MATH 150. Applied Calculus. 3 Hours.
PR: Satisfy the minimum ACT/SAT math score, or satisfactory performance on departmental placement examination, or C- in (MATH 126A or MATH 126B or MATH 126C) or MATH 129. For students in other disciplines needing calculus for applications. Limits of sequences and functions, continuity derivatives, and integrals of polynomials, rational functions, and exponential and logarithmic functions, partial derivatives, maxima and minima. Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

MATH 155. Calculus 1. 4 Hours.
PR: Satisfy the minimum ACT/SAT math score, or satisfactory performance on departmental placement examination, or C- in MATH 129. Introduction to limits, continuity, derivatives, antiderivatives, definite integrals, and applications of the derivative. Not open to students who have earned credit in MATH 153 and/or MATH 154.

MATH 156. Calculus 2. 4 Hours.
PR: A minimum grade of C- in MATH 154 or MATH 155. Techniques of integration, application of the definite integral, polar coordinates, indeterminate forms, and infinite series.

MATH 251. Multivariable Calculus. 4 Hours.
PR: MATH 156 with a minimum grade of C-. Introduction to solid analytic geometry, vector algebra, and calculus of several variables.

MATH 261. Elementary Differential Equations. 4 Hours.
PR: MATH 251 with a minimum grade of C-. Ordinary differential equations, Laplace transforms, partial differential equations, Fourier series, and applications.

MATH 283. Introduction to the Concepts of Mathematics. 3 Hours.
PR: MATH 156 or consent. Elementary logic, basic theory, relations and functions, equivalence relations and decomposition of sets, order relations, and cardinality. Emphasis on learning to prove theorems.

MATH 315. Advanced Technical Mathematics. 4 Hours.
PR: MATH 117 with a grade of C or better. This course may not be used as credit toward a math major or minor. Applications of integration to areas, volumes, centroids, and moments of inertia; differentiation and integration of trigonometric, logarithmic and exponential functions; methods of integration expansion of functions in series; elementary differential equations.

MATH 341. Introduction to Algebraic Structures. 3 Hours.
PR: MATH 283 or consent. A study of groups, rings, and fields together with their substructures, quotients and products, morphisms; the fundamental homomorphism theorems.

MATH 378. Discrete Mathematics. 3 Hours.
PR: MATH 283. Permutations, combinations, binomial theorem, inclusion-exclusion formula, recurrence relations, generating functions, elementary graph theory (connectivity, paths, circuits, trees, vertex and edge coloring, graph algorithms) matching theory, and discrete optimization. (Equiv. to CS 426.)

MATH 381. Introduction to Analysis and Topology. 3 Hours.
PR: MATH 283 or consent. Introduction to metric and topological spaces. Topics include: continuity, convergence, separation, compactness, and connectedness.

MATH 420. Numerical Analysis 1. 3 Hours.
PR: MATH 251 and (either a programming language or MATH 222.) Computer arithmetic, roots of equations, interpolation, Gaussian elimination, numerical integration and differentiation. Numerical solution of initial value problems for ordinary differential equations. Least square approximations. (Equiv. to CS 460.)

MATH 441. Applied Linear Algebra. 3 Hours.
PR: MATH 251. Matrix algebra with emphasis on algorithmic techniques and applications to physical models. Topics include solution of large systems of equations, orthogonal projections and least squares, and eigenvalue problems.

MATH 448. Probability and Statistics. 3 Hours.
PR: MATH 251 and MATH 315 with a grade of B or higher. Samples spaces; probability, definition and elementary properties; random variables, expectation; special distributions; estimation; hypothesis testing; linear regression.

MATH 451. Introduction to Real Analysis 1. 3 Hours.

MATH 452. Introduction to Real Analysis 2. 3 Hours.
MATH 456. Complex Variables. 3 Hours.
PR: MATH 261. Complex numbers, functions of a complex variable; analytic functions; the logarithm and related functions; power series; Laurent series and residues; conformal mapping and applications.

MATH 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

MATH 496. Senior Thesis. 1-3 Hours.
PR: Consent.

MECHANICAL ENGINEERING

MAE 120. Drafting with Solid Modeling. 2 Hours.
Fundamentals of drafting through the use of sketching and computer graphics as applied to orthographic views, sectional views, isometric views, and threads and fasteners.

MAE 201. Applied Engineering Analysis. 3 Hours.
PR: ENGR 111 and MATH 156. Overview of engineering analysis fundamentals. Applied linear algebra and statistical analysis. Use of software such as spreadsheets, symbolic and analytic mathematical modeling packages, solid modeling packages, preparation of graphs of data and curve fitting.

MAE 240. Manufacturing Processes. 3 Hours.
PR: GPHS 120. An introduction to manufacturing systems and strategy. A study of manufacturing processes. Measurement and quality assurance, engineering materials; machining, welding and casting processes; hot and cold forming and joining processes, manufacturing and production systems, thermal treatments; equipment and process demonstration films. Lab involves student performed projects utilizing experience in operation of the various processes.

MAE 241. Statics. 3 Hours.
PR: WVU sections require PHYS 111 and (MATH 154 or MATH 155) all with a grade of C- or better, WVUIT sections require MATH 155 as a prerequisite. Engineering applications of force equilibrium. Vector operations, couples and moments, resultants, centers of gravity and pressure, static friction, free-body diagrams, trusses and frames.

MAE 242. Dynamics. 3 Hours.
PR: WVU sections require MATH 156 with a grade of C- or better and MAE 241, WVUIT sections require MATH 156 and MAE 241 as prerequisites. Newtonian dynamics of particles and rigid bodies. Engineering applications of equations of motion, work and energy, conservative forces, acceleration in several coordinate systems, relative motion, instantaneous centers, and plane motion.

MAE 243. Mechanics of Materials. 3 Hours.
PR: WVU sections require MATH 156 with a grade of C- or better and MAE 241, WVUIT sections require MATH 156 and MAE 241 as prerequisites. Stress deformation, and failure of solid bodies under the action of forces. Internal force resultants, stress, strain, Mohr's circle, and mechanical properties of materials, generalized Hooke's law. Axial bending and buckling loads, and combinations.

MAE 320. Thermodynamics. 3 Hours.
PR: WVU sections require PHYS 111 and MATH 156, WVUIT sections require MATH 156 as a prerequisite. Principles of thermodynamics; properties of ideal gases and vapors; first and second laws of thermodynamics; basic gas and vapor cycles; basic refrigeration.

MAE 321. Applied Thermodynamics. 3 Hours.
PR: MAE 320. Applications to mechanical systems from fundamentals of thermodynamics; availability analysis; applied gas and vapor power cycles; applied refrigeration and psychrometry; mixtures of real gases and vapors; combustion; choked flow nozzles. (3 hr. lec.).

MAE 331. Fluid Mechanics. 3 Hours.
PR: WVU sections require MATH 251 with a grade of C- or better and MAE 241, WVUIT sections require MATH 156 and MAE 242 as prerequisites. Properties of fluids, fluid statics, inviscid fluid dynamics, fluid kinematics, thermodynamic principles, mass momentum and energy principles, similitude and dimensional analysis, laminar and turbulent flow, viscous effects, flow in pressure conduits and external flows.

MAE 332. Experimental Methods. 1 Hour.
PR: MAE 334 and MAE 201 Methodology of experimental investigation; common properties of electrical, mechanical, thermal, and fluid systems, statistical analysis of data.

MAE 333. Mechanical Measurements. 1 Hour.

MAE 340. Vibrations. 3 Hours.
PR: MATH 261 and ENGR 242. Revises of linear algebra. Systems of one degree of freedom, undamped and damped; free and forced vibrations; transient and nonlinear vibrations; multi-degree of freedom systems with simulations by analog or digital computer.

MAE 342. Dynamics of Machines. 3 Hours.
PR: WVU sections require MAE 242 and PR or CONC: MATH 261, WVUIT sections require MAE 242 as a corequisite. Analysis of motion and forces in linkages and mechanisms. Synthesis of plane mechanisms, analysis of cams, gears and gear trains. Fundamentals of vibrations in machines. Analysis techniques include graphical, analytical and computational methods.
MAE 405. Senior Mechanical Engineering Lab. 1 Hour.
PR: MAE 335 and MAE 336 and MAE 201. Analysis and testing of selected thermal or mechanical systems, such as, turbines, fans, pumps, air conditioning, vibrations, and internal combustion engines, statistical analysis.

MAE 407. Power Plant Engineering. 3 Hours.
PR: MAE 334 and MAE 336 or consent. Fuels and combustion, steam generators, superheaters; condensers, economizers; feedwater heaters; air preheaters; draft systems; introduction to nuclear power plant systems; aspects of environmental pollution, alternative energy systems including hydroelectric plants; field trips.

MAE 410. Materials Science. 4 Hours.
PR: CHEM 115 and ENGR 243 and Senior standing. Metals, microstructure, chemical composition, heat treatment, plastic deformation, fracture, fatigue, creep and wear; introduce preparation and microscopic examination of specimens; advanced materials testing.

MAE 419. Heat Transfer Lab. 1 Hour.
PR: MAE 320. This course will introduce students to various heat transfer processes such as conduction, convection, and heat exchangers. Using computer compatible equipment specially designated for educational purposes.

MAE 423. Heat Transfer. 3 Hours.
PR: WVU sections require MATH 261 with a grade of C- or better and MAE 320 and (MAE 331 or MAE 335), WVUIT sections require MAE 320 and MAE 321 as prerequisites and MAE 419 as a corequisite. One-, two-, three-dimensional steady state conduction; transient conduction; free and forced convection; radiation; heat exchangers; heat and mass transfer by analytical, numerical analogical and experimental methods; design of thermal systems.

MAE 425. Internal Combustion Engines. 3 Hours.
PR: WVU sections require MAE 320, WVUIT sections require MAE 321 as a prerequisite. IC engine operating characteristics; engine cycles; thermochemistry and fuels; air and fuel induction; fluid motion within combustion chamber; combustion; exhaust flow; emissions and air pollution; heat transfer in engines; friction and lubrication; advanced engine concepts.

MAE 427. Heating, Ventilating, and Air Conditioning. 3 Hours.
PR: WVU sections require MAE 320 or consent, WVUIT sections require MAE 321 and MAE 423 as prerequisites or department consent. Air and humidity relations; comfort and indoor air quality; building heat transfer; design heating and cooling loads; air distribution; refrigeration; systems and equipment; system energy analysis; control systems.

MAE 428. Aerodynamics. 3 Hours.
PR: ENGR 331 and MAE 334 Bernoulli’s equation; dimensional analysis; potential flow analysis; lift analysis; compressible flow through nozzles; shock wave analysis; boundary layer effects; experimental testing in subsonic and supersonic flows.

MAE 429. Theory of Turbomachines. 3 Hours.
PR: MAE 334 and ENGR 331. Dimensional analysis; energy transfer between a fluid and a rotor; thermodynamics of gas flow; flow of fluid in turbomachines; centrifugal pumps and compressors; radial flow turbines; axial flow turbines; performance of compressors and pumps and comparison of types.

MAE 440. Industrial Hydraulics: Components and Circuits Design. 3 Hours.

MAE 454. Machine Design and Manufacturing. 3 Hours.
PR: WVU sections require MATH 261 with a grade of C- or better and MAE 342 and MAE 343, WVUIT sections require MAE 243 as a prerequisite and MAE 342 as a corequisite. Working stresses, theories of failure, fatigue, welded joints, design of machine elements such as shafting, screws, springs, belts, clutches, brakes, gears, bearings, and miscellaneous machine elements. Design for manufacturability considerations.

MAE 455. Computer Aided Drafting and Design. 3 Hours.
PR: MAE 201 and MAE 304 and Senior status or Consent. Computer-aided design fundamentals. Use of graphics capabilities of the microcomputer for engineering design and simulation. Exposure to commercial CAD and motion simulation packages. 2-D and 3-D computer drafting. Solid modeling applications. A preparatory course for finite element method.

MAE 456. Computer Aided Design and Finite Element Analysis. 3 Hours.
PR: WVU sections require MATH 261 with a grade of C- or better and MAE 343 and (MAE 342 or MAE 345), WVUIT sections require MATH 251 and MAE 454 and MAE 455 as prerequisites and MAE 423 as a corequisite. Computer aided design fundamentals and formulation of the stiffness matrix and load vector 1D and 2D elements based on variational principles. Analytical and finite element solution of vibration and heat transfer problems. Explore applications of CAD/FEM packages in design case studies.

MAE 460. Automatic Controls. 3 Hours.
PR: WVU sections require MATH 261 with a grade of C- or better, WVUIT sections require EE 221 and MATH 261. Modeling and simulation of mechanical systems using transfer functions. 1st and 2nd order systems with associated specification. Block algebra and concept of Equivalent Transfer Function. Steady state errors. Routh-Hurwitz criteria for stability. Root locus based design of proportional controllers and compensators. Introduction to state variables modeling.
MAE 463. Advanced Machine Design. 3 Hours.

MAE 464. Mechanical Engineering Projects. 1-4 Hours.
PR: Jr or Sr standing. An investigation of analytical or experimental nature; design, construction and testing of an experimental apparatus.

MAE 480. System Design 1. 3 Hours.
PR: MAE 404 one semester before graduation. Professional ethics, the role of engineer in society, professionalism and current issues in engineering. Systems design applied to a project; lectures cover morphology of design, the design processes, decision and optimization techniques, and computer aided design. Begin a design project to be completed in MAE 481.

MAE 481. Systems Design 2. 3 Hours.
PR: MAE 480. A semester long design project in which students normally work in teams. Formal report required at the end of the semester.

MAE 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

MILITARY SCIENCE

MILS 101. Military Science. 2 Hours.
The organization and development of the U.S. Army and ROTC from its inception to the present. The structure and role of the U.S. defense establishment with emphasis on the broad range of America civil-military relations.

MILS 102. Military Science. 2 Hours.

MILS 103. Leadership Laboratory 1. 1 Hour.
Open only to (and required of) students in the associated Military Science course. This laboratory course is designed to offer the student an opportunity for integration and application of training management and leadership skills. Team academic alignment. Course includes confidence building exercises such as rappelling, group presentations, basic marksmanship, and drill and ceremonies.

MILS 201. Military Science. 2 Hours.
Introduction to basic leadership and management with emphasis on the fundamental concepts and skills required of today's citizen-soldier.

MILS 202. Military Science. 2 Hours.
Continued instruction in basic fundamentals of leadership and management, with emphasis on the military application of these fundamentals. Introduction to small unit tactics and organization.

MILS 203. Leadership Laboratory. 1 Hour.
Open only to (and required of) students in the associated Military Science course (101, 102, 201, 202). This laboratory course is designed to offer the student an opportunity for integration and application of training management and leadership skills. Team members and leadership positions are tailored based on the students’ academic alignment. Course includes confidence building exercises such as rappelling, group presentations, basic marksmanship, and drill and ceremonies.

MILS 301. Military Science. 3 Hours.
PR: Basic course or equiv. (Equivalent credit may be granted by the WVU Director of Admissions and the professor of military science on the basis of prior military services, or ROTC training other than courses in military science taken at WVU.) Examines the requirements for military training and the psychological and technical aspects of effective instruction. Additionally, the military career system and the occupational specialties options available are reviewed.

MILS 302. Military Science. 3 Hours.

MILS 303. Leading Small Organizations 1. 2 Hours.
Series of practical opportunities to lead small groups, receive personal assessments and encouragement, and lead again in situations of increasing complexity. Uses small unit defensive tactics and opportunities to plan and conduct training for lower division students both to develop skills and as vehicles for practicing leading. The military science leadership lab (MILS 303) plus participation in the advanced physical fitness course are required in conjunction with this class. Participation in one weekend field training exercise is also required, and one or two more weekend exercises may be offered for optional participation.

MILS 401. Military Science. 3 Hours.
PR: MILS 301 and MILS 302 or consent. Stresses the responsibilities of an officer and affords leadership experience as a cadet leader. Military staff procedures, military law, and military organizations, which prepare the student for future services, are studied.

MILS 402. Military Science. 3 Hours.
PR: MILS 401 or consent. Advanced leadership techniques, unit operations, and personnel management problems are discussed in seminars. The military role in United States foreign policy and world affairs is examined.
MILS 403. Leadership Challenges and Goal Setting. 2 Hours.
Plan, conduct and evaluate activities of the ROTC cadet organization. Articulate goals and put plans into action to attain them. Assess organizational cohesion and develop strategies to improve it. Develop confidence in skills to lead people and manage resources. Learn/apply various Army policies and programs in this effort. The military science leadership lab, (MILS 403), plus participation in the advanced physical fitness course are required in conjunction with this class. Participation in one weekend field training exercise is also required, and one or two more weekend exercises may be offered for optional participation.

MULTIDISCIPLINARY STUDIES

MDS 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

MUSIC

MUSC 111. Introduction to Music. 3 Hours.
(Not open to music majors). Introductory course designed to develop an appreciation and understanding of the significance of music as a fine art, and to help the student develop intelligent listening habits.

MUSC 115. Introduction to History of Jazz. 3 Hours.
PR: MUSC 111 or consent. (Not open to music majors). An Introduction to jazz, its characteristics, important performers, and their music, including an historical survey with attention to the changing style of the music.

MUSC 116. Music in World Cultures. 3 Hours.
(Not open to music majors). Examination of music from various cultures (e.g. Native America, South India, Japan, Africa) within their cultural contexts.

NURSING

NSG 100. Introduction to Nursing. 2 Hours.
Introduction to the role of the nurse in modern health care: critical thinking, nursing interventions, professionalism, caring and communication in nursing practice with emphasis on safety, quality, health, culture, ethics, leadership, and health policy.

NSG 211. Health Assessment & Communication. 6 Hours.
PR: NSG 100 with a minimum grade of C-. Examination of concepts, principles, and models that guide nursing practice related to physical, psychosocial, spiritual, developmental, cultural, intellectual assessment and communication across the lifespan in the classroom, simulation, and various clinical settings.

NSG 212. Foundations of Nursing Practice. 6 Hours.
PR: NSG 211 with a minimum grade of C-. Theories, concepts, principles, and processes that lay the foundation for critical thinking, nursing interventions, communication, professional role and caring in the practice of nursing. Application of the nursing process in classroom, simulation, and clinical experiences.

NSG 276. Evidence Based Practice and Research. 3 Hours.
PR: NSG 211 and (STAT 201 or STAT 211) with a minimum grade of C- in each. Theory, concepts, and methods of the research process intended to provide a basic understanding that is necessary for the translation of current evidence into nursing practice.

NSG 310. Maternal Infant Nursing & Women's Health Care. 4 Hours.
PR: NSG 212 and PR or CONC: NSG 311 and NSG 376 with a minimum grade of C-. Human response to normal and abnormal changes in health status across the female lifespan and adaptations of the childbearing family. Provision of the holistic nursing care to women and childbearing families in the clinical area.

NSG 311. Alterations in Adult Health 1. 6 Hours.
PR: NSG 212 and PR or CONC: NSG 376 with a minimum grade of C- in each. Pathophysiology and holistic nursing care of adults experiencing acute and chronic problems. Use of the nursing process to plan and provide interventions appropriate to health care needs in the clinical setting.

NSG 312. Alterations in Adult Health 2. 6 Hours.
PR: NSG 311 and NSG 376 with a minimum grade of C- in each. Builds on NSG 311 using critical thinking and nursing process in a team based learning format, paired with clinical application, to explore holistic nursing care of adults with acute and chronic health problems.

NSG 320. Child and Adolescent Health. 4 Hours.
PR: NSG 311 and NSG 376 with a minimum grade of C- in each. Didactic and clinical experiences focused on human response to alterations in health, developmental needs, and family-centered care specific to pediatric population with emphasis on the professional nursing role, evidence-based reasoning, therapeutic communications, and caring.

NSG 360. Ethics and Health Policy. 3 Hours.
PR: NSG 212 and ENGL 102 with a minimum grade of C- in each. Ethical decision-making in health care situations across the lifespan, including palliative and end of life care. Health care policy, legal and regulatory issues are discussed.

NSG 376. Clinical Nursing Pharmacology. 3 Hours.
PR: NSG 211 with a minimum grade of C-. Principles of pharmacology emphasizing scholarly inquiry and evidence-based reasoning to insure accurate knowledge of and administration of medications to individuals and families across the lifespan. Pharmacological management is analyzed in conjunction with pathophysiology.
NSG 411. Nursing in Complex Community Systems. 7 Hours.
PR: NSG 276 and NSG 310 and NSG 312 and NSG 320 and NSG 360 with a minimum grade of C- in each. Comprehensive theoretical introduction to community health nursing paired with clinical experience focused on promoting health and preventing disease in multiple populations. Culminates in a capstone project that addresses an identified community health need.

NSG 412. Leadership in Complex Systems. 7 Hours.
PR: (NSG 312 and NSG 360 and NSG 450) with a grade of C or better. Development of leadership and management skills necessary for professional nursing practice and interventions supporting multiple patients in acute-care complex systems. Classroom experiences paired with 225 hours of precepted leadership experience.

NSG 450. Alterations in Mental Health. 4 Hours.
PR: NSG 310 and NSG 312 and NSG 320 and NSG 360 with a minimum grade of C- in each. Theory and Practice of professional nursing in response to complex alterations in psychosocial function and their impact on individuals, families, and communities. Classroom and clinical experiences.

NSG 460. Care of the Critically Ill Patient. 4 Hours.
PR: NSG 312 and NSG 411 and NSG 450 with a minimum grade of C- in each. Focuses on the professional nursing role in supporting individuals and families experiencing complex physiological alterations in health. Paired with clinical experiences supporting individuals and families in critical care settings.

NSG 478. The Role of the Nurse in the Patient Experience. 2 Hours.
PR: NSG 212 with a minimum grade of C-. Didactic experience focused on exploring the nurse’s role in the patient’s and family’s healthcare experience.

NSG 480. Core Concepts in Gerontological Nursing. 2 Hours.
PR: NSG 211 and NSG 212 with a minimum grade of C- in each and Junior or Senior standing. Examination of patient specific concepts, nursing assessments, interventions, and models of care that guide nursing practice related to holistic care of the older adult.

NSG 482. Palliative Care Nursing. 2 Hours.
Focus is on the care of patients with chronic non-curable conditions across the life span. The course analyzes the definition of palliative care and defines the role of hospice as a part of palliative care. Cultural sensitivity and communication with palliative care patients and their families is emphasized.

NSG 484. Care of the Diabetic Patient. 2 Hours.
PR: Consent. In-depth analysis of nursing care of the patient with diabetes.

NSG 485. Children With Complex Health Needs. 2 Hours.
PR: NSG 320 with a minimum grade of C-. The nursing care of children with complex acute and chronic health problems with a focus on decision-making using a case study problem based learning approach.

NSG 486. NCLEX Review. 1 Hour.
PR: Senior status. Focuses on achievement of professional success by preparing for RN licensure. Preparation for NCLEX will be the focus of this by enhancing NCLEX testing skills.

PHYSICAL EDUCATION

PE 100. Lifetime Activities. 1 Hour.
(May be repeated for a maximum of 2 credit hours). Health and physical education concepts includes carry over skills and techniques in a broad and varied list of elective activities.

PE 104. Intermediate Basketball. 1 Hour.
(May be repeated for a maximum of 2 credit hours). Introduction to intermediate knowledge and skills in basketball.

PE 110. Military Physical Conditioning. 1 Hour.
(May be repeated for a maximum of 2 credit hours).

PE 130. Flag Football. 1 Hour.
(May be repeated for a maximum of 2 credit hours). Introduction to beginning knowledge and skills in flag football.

PE 157. Slow Pitch Softball. 1 Hour.
(May be repeated for a maximum of 2 credit hours). Introduction to beginning knowledge and skills in slow pitch softball.

PE 159. Soccer. 1 Hour.
(May be repeated for a maximum of 2 credit hours). Introduction to beginning knowledge and skills in soccer.

PE 161. Tennis. 1 Hour.
(May be repeated for a maximum of 2 credit hours). Introduction to basic knowledge and skills for people who are familiar with tennis.

PE 164. Weight Training. 1 Hour.
(May be repeated for a maximum of 2 credit hours). Introduction to beginning knowledge and skills in weight training.

PE 165. Conditioning. 1 Hour.
(May be repeated for a maximum of 2 credit hours). Introduction to beginning knowledge and skills in conditioning.

PE 170. Volleyball. 1 Hour.
(May be repeated for a maximum of 2 credit hours). Introduction to beginning knowledge and skills in volleyball.
PE 173. Beginning Swimming. 1 Hour.  
(May be repeated for a maximum of 2 credit hours). Introduction to beginning knowledge and skills in swimming.

PE 174. Intermediate Swimming. 1 Hour.  
(May be repeated for a maximum of 2 credit hours). Introduction to intermediate knowledge and skills in swimming.

PE 175. Lifeguard Training. 2 Hours.  
(May be repeated for a maximum of 2 credit hours). Red Cross certification for lifeguards.

PE 176. Advanced Swimming. 1 Hour.  
(May be repeated for a maximum of 2 credit hours). Introduction to advanced knowledge and skills in swimming.

PE 179. Orientation to Scuba. 1 Hour.  
(May be repeated for a maximum of 2 credit hours). Introduction to beginning knowledge and skills in scuba diving.

PE 187. Golf. 1 Hour.  
(May be repeated for a maximum of 2 credit hours). The course is designed to introduce students to the rules, skills, and strategies involved in golf.

PE 220. Striking and Field Games. 1 Hour.  
This teaching games for understanding (TGfU) course is designed to introduce the students to the rules, skills, and strategies involved in playing striking and fielding games.

PE 221. Invasion Games. 1 Hour.  
This teaching games for understanding (TGfU) course is designed to introduce the students to the rules, skills, and strategies involved in playing games where one invades their opponent's territory.

PE 223. Net and Wall Games. 1 Hour.  
This teaching games for understanding (TGfU) course is designed to introduce the students to the rules, skills, and strategies involved in playing net and wall games.

PHYSICAL EDUCATION/TEACHING

PET 124. Human Body: Structure and Function. 2 Hours.  
Overview of the structure and function of the organ systems in the human body. Topics covered include the skeletal, muscular, nervous, digestive, respiratory, and cardiovascular systems.

PET 125. Principles of Human Movement. 2 Hours.  
PR: PET 124. This course is designed to introduce prospective physical educators to the principles of human movement. Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

PET 175. Motor Development. 2 Hours.  
To examine changes in human movement behavior across the lifespan, the processes that underline these changes, and the factors that contribute to those changes.

PET 233. Pedagogy Theory and Application. 4 Hours.  
PR: Admission to the Physical Education Teacher Certification Program. Applied pedagogical theory, including assessment, planning, design, management, and delivery of instruction in physical education settings.

PET 324. Water Safety Instructorships. 2 Hours.  
PR: Senior Lifesaving Certification. Teaching methods in swimming and water safety. Meet American Red Cross certification standards. Course completion carries eligibility for teaching swimming, lifesaving, and water safety.

PHYSICAL SCIENCE

PHSC 101. Introductory Physical Science 1. 4 Hours.  
(For Elementary Education majors only.) Emphasis on practicing reasoning abilities necessary to carry out simple scientific inquiry. Major concepts include properties of matter and astronomy. Majority of class time is spent in laboratory activities and solving problems using an activity-based approach.

PHSC 102. Introductory Physical Science 2. 4 Hours.  
PR: PHSC 101. Continuation of PHSC 101. Concepts include electricity, motion, heat and temperature, energy, and chemistry.

PHSC 311. Astronomy. 3 Hours.  
PR: MATH 124. Current theories and concepts of astronomy; structure and composition of solar system; formation, structure, and evolution of stars; structure, composition, and motion of the Milky Way and other galaxies; structure and evolution of the Universe.

PHYSICS

PHYS 101. Introductory Physics. 4 Hours.  
PR or CONC: MATH 128 or MATH 129 or MATH 150 or MATH 153 or MATH 154 or MATH 155 or MATH 156 or consent or satisfactory performance on MATH departmental placement exam. The fundamental philosophy and principles of physics are applied to studies of mechanics, sound, heat, and thermodynamics through demonstrations, problems, and experiments. Pre-requisites and/or co-requisites may differ on regional campuses.
PHYS 102. Introductory Physics. 4 Hours.
PR: PHYS 101. The fundamental philosophy and principles of physics are applied to studies of electricity, magnetism, optics, light, and atomic and nuclear physics through demonstrations, problems, and experiments. Pre-requisite(s) and/or co-requisite(s) may differ on regional campuses.

PHYS 111. General Physics. 4 Hours.
PR: MATH 155 with a grade of C or better or (MATH 153 with a grade of C or better and PR or CONC: MATH 154). Survey of classical mechanics, thermodynamics and waves.

PHYS 112. General Physics. 4 Hours.
PR: PHYS 111. Survey of electricity, magnetism, and optics.

PHYS 293. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

PHYS 314. Introductory Modern Physics. 4 Hours.
PR: PHYS 112 and MATH 156. Topics of modern physics of interest to science majors and engineers; atomic and molecular structure and spectra, solid state and nuclear physics, relativity, and elementary particles.

PHYS 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

POLITICAL SCIENCE

POLS 102. Introduction to American Government. 3 Hours.
General survey of American national government and politics.

POLS 103. Global Political Issues. 3 Hours.
Analysis of issues in post-cold war international politics, ranging from traditional major power diplomacy and intervention to the newer problems of economic interdependence and development, human rights, population pressures on limited resources, and the environment.

POLS 220. State and Local Government. 3 Hours.
The legal basis, structure, politics and operation of state and local governments, in the content of the American federal system.

POLS 260. Introduction to International Relations. 3 Hours.
Theories and concepts in international politics and their application to contemporary world politics.

POLS 293. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

POLS 311. Political Parties & Elections. 3 Hours.
Parties and elections in America; emphasis on nomination and general election processes, campaigns, the mass media, campaign finance, voting, the electoral college, and parties in government.

POLS 312. American Constitutional Law. 3 Hours.
The role of the Constitution in the American political system. Topics include the political concept of constitutionalism; the role of the Supreme Court in the political process; division of powers among the three branches of government; and the constitutional relation between the national government and the states.

POLS 319. Comparative Government. 3 Hours.
Comparison of governmental systems in Europe, Asia, Latin America, and Africa. Select countries in each region will be studied with regard to their political institutions and SOCI- economic systems.

POLS 400. Terrorism and National Security. 3 Hours.
PR: POLS 102. Basic overview of terrorism tactics and national security initiatives.

POLS 480. Seminar in Non-Profit Administration. 3 Hours.
Special Topics in the area of non-profit administration and current problems.

POLS 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

PSYCHOLOGY

PSYC 101. Introduction to Psychology. 3 Hours.
Survey of general psychology.

PSYC 201. Psychology as a Profession. 1 Hour.
PR: PSYC 101. Orientation to opportunities for experience, employment, and graduate and professional training in psychology.

PSYC 202. Research Methods in Psychology. 3 Hours.
PR: PSYC 101 and (STAT 201 or STAT 211). Research methods in experimental, developmental, clinical, and community-social psychology in the laboratory and the natural environment.
PSYC 203. Research Methods & Analysis 1. 3 Hours.
PR: PSYC 101 and (MATH 126 or higher, or a satisfactory ACT/SAT math score, or satisfactory math placement exam performance). Research methods and data analysis utilizing descriptive and correlational designs in developmental, experimental, clinical, and social psychology in the laboratory and the natural environment.

PSYC 241. Introduction to Human Development. 3 Hours.
PR: PSYC 101. Survey of human psychological development across the life span with emphasis on change in biological, cognitive, and social-emotional processes. Special attention given to theoretical, conceptual, methodological, and practical issues.

PSYC 281. Introduction to Abnormal Psychology. 3 Hours.

PSYC 301. Biological Foundations of Behavior. 3 Hours.
PR: PSYC 101 and (PSYC 202 or PSYC 204). Introduction to animal behavior. Survey of fundamental concepts (evolution, genetics, adaptation, and learning) and research methods in understanding animal behavior including primate species. Includes laboratory exercises and demonstrations.

PSYC 302. Behavior Principles. 4 Hours.
PR: PSYC 101 and (PSYC 202 or PSYC 204). Principles of behavior and learning and the significance of these principles for psychological theory and application; laboratory exercises and demonstrations.

PSYC 331. History and Systems of Psychology. 3 Hours.
PR: PSYC 202 or PSYC 203 or PSYC 204 or PSYC 231 or PSYC 232 or PSYC 241 or PSYC 251 or PSYC 293 and at least junior or senior standing. A survey of psychology from its origins in philosophy, biology, and physics through the early major schools of psychological thought to modern perspectives on the science of behavior and its applications to human affairs.

PSYC 343. Child and Adolescent Development. 3 Hours.
PR: PSYC 241 and junior or senior standing. Theory and research on major psychological processes in childhood and adolescence; maturation, personality, socialization, sensory, and cognitive development.

PSYC 351. Topics in Social Psychology. 3 Hours.
PR: PSYC 251 and junior or senior standing. Social factors that determine human behavior, survey of research in selected areas of social psychology and their implications for social phenomena.

PSYC 362. Psychological Assessment. 3 Hours.
PR: PSYC 202 or PSYC 204 and at least junior standing. Psychometric theory and development of psychological assessment instruments. Includes behavioral, personality, intellectual, neuropsychological, forensic, achievement, and aptitude assessment.

PSYC 363. Personality Theory. 3 Hours.
PR: PSYC 202 or PSYC 204 and at least junior standing. Theoretical and empirical readings in a survey of major perspectives in personality theory, including dynamic, cognitive, humanistic, and behavioral.

PSYC 382. Exceptional Children. 3 Hours.
PR: PSYC 241 and junior or senior standing. Exceptional mental retardation or advancement; organic disabilities having behavioral consequences, such as cerebral palsy or deafness; and behavior disorders.

PSYC 401. Psychology Capstone Experience. 1 Hour.
PR: PSYC 101 and PSYC 201 and STAT 211 and senior standing. Experience in coursework, research, or service that integrates knowledge gained as a major in psychology. To be taken concurrently with capstone experience, details of which are to be determined in consultation with advisor.

PSYC 424. Learning and Behavior Theory. 3 Hours.
PR: PSYC 302 and junior or senior standing. Advanced course in empirical and theoretical issues in the psychology of learning.

PSYC 474. Applied Behavior Analysis. 3 Hours.
PR: PSYC 302 and junior or senior standing. The application of basic learning principles to changes in socially significant human behavior.

PSYC 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experimental learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

PSYC 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

PSYC 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regularly scheduled courses.

SOCIOLGY AND ANTHROPOLOGY

SOCA 101. Introduction to Sociology. 3 Hours.
Basic course intended to develop a perspective about the nature of social processes and the structure of society.

SOCA 105. Introduction to Anthropology. 3 Hours.
Essentials of human evolution and prehistory with a concentration on the varieties of languages and cultures found among peoples of the world.
SOCA 207. Social Problems in Contemporary America. 3 Hours.
Sociological analysis of the causes, effects and approaches to preventing and reducing social problems in American society.

SOCA 221. Families and Society. 3 Hours.
Historical comparative approach to changing structure and functions of the family institution. Effect of economic, demographic, and cultural changes on relationships, gender roles, marriage, childcare; variations by socioeconomic status, race, ethnicity, gender, sexual orientation.

SOCA 232. Criminology. 3 Hours.
PR: SOCA 101. Exploration of various theories of criminal behavior; emphasis on a critical study of the criminal justice system and efforts to reform the penal system.

SOCA 235. Race and Ethnic Relations. 3 Hours.
Racial and ethnic groups are examined in terms of their history, transformation over time, and the contemporary conditions and issues they face. Emphasis is on prejudice as well as systemic racism.

SOCA 302. Deviant Behavior. 3 Hours.
PR: SOCA 232 and (SOCA 234 or CJ 101) or consent. Examination of the processes by which deviance is defined in society, and the methods of social control attempted. Provides a critical understanding of society from the perspective of those defined as outsiders-criminals, addicts, etc.

SOCA 305. Social Stratification Social and Power in American Society. 3 Hours.
PR: SOCA 101 or Consent. The course will focus on patterns of wealth, prestige, and power in American society. The contemporary configuration of class will be analyzed in the light of historical patterns as well as future developments. The impact of class status on the individual and psychological patterns of class behavior will be studied. Philosophic arguments regarding the ethics of inequality will be considered.

SOCA 311. Social Research Methods. 3 Hours.
PR: SOCA 101 and (STAT 201 or STAT 211 or ECON 225). Logic of social research, elements of research design, and problems of measurement, with emphasis on survey research methodology and data analysis.

SOCA 312. Death and Dying. 3 Hours.
This course explains the issues and problems associated with death in American society. Topics such as changing attitudes, grief, funeral practices, life after death, the dying patient, and widowhood are presented from a variety of perspectives.

SOCA 325. Illness and Health Care. 3 Hours.
An overview of behavioral factors relating to occurrence of and response to illness, with particular emphasis upon American medicine. Designed especially for students interested in health-related careers.

SOCA 333. Sociology of Work and Work Places. 3 Hours.
PR: SOCA 101 or consent. Explores the significance of work and work relations in contemporary society. Emphasis is given to the analysis of employment settings including industrial organizations.

SOCA 360. Women and Men in Society. 3 Hours.

SOCA 430. World Religions. 3 Hours.
Study of the major religious traditions of the world. Through specialized lectures, speakers, assigned readings, field trips, and occasional videos students will gain a broad basis knowledge of the major religions.

SOCA 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

SOCA 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

SOCA 497. Research. 1-6 Hours.
Independent research projects.

SPANISH

SPAN 101. Elementary Spanish 1. 3 Hours.
PR: Score of S1 on placement test or no prior study of the language or departmental consent. Introduction to the sound and writing systems of the language with emphasis on listening, speaking, reading and writing within an authentic cultural context. (Course presumes no prior knowledge of the language.).

SPAN 102. Elementary Spanish 2. 3 Hours.
PR: SPAN 101 or score of S2 on placement exam. Continuation of SPAN 101. Introduction to the sound and writing systems of the language with emphasis on listening, speaking, reading, and writing within an authentic cultural context.

SPAN 203. Intermediate Spanish 1. 3 Hours.
PR: SPAN 102 or score of S3 on placement exam. Continuation of SPAN 102.
SPAN 204. Intermediate Spanish 2. 3 Hours.
PR: SPAN 203 or score of S4 on placement exam. Foundation for advanced study of Spanish. Emphasis on oral and written communication.

SPAN 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

SPORT AND EXERCISE PSYCHOLOGY

SEP 271. Sport in American Society. 3 Hours.
Sociocultural investigation of sport in American society.

SEP 272. Psychological Perspectives of Sport. 3 Hours.
An examination of personality and behavioral factors as they affect participation in sport. Topics such as stress and sport, body image, aggression and the sport participant, and the licensure of sport psychologists highlight the course.

SPORT MANAGEMENT

SM 167. Introduction to Sport Management. 3 Hours.
Overview of the sport management profession including career opportunities, critical current issues, trends, professional standards and the professional organizations.

SM 275. The Olympic Games. 3 Hours.
An examination of the historical development of the Olympic Games from the Greek classic period (500 B.C.) to the games of the XXVI Olympiad of Atlanta in 1996.

SM 340. Sport Governance. 3 Hours.
This course examines how sport organizations interact and coordinate with numerous policy actors to facilitate and coordinate the mechanisms of governance.

SM 345. Technology in Sport Management. 2 Hours.
PR: Majors only. This course provides an understanding of the technological concepts and principles relevant to sport management and provides student with practical experiences in the use of emerging technologies in the field.

SM 350. Leadership in Sport Management. 2 Hours.
PR: Majors only. The purpose of this course is to identify the fundamental leadership behaviors in sport management. This course provides sport management students the opportunity to explore current leadership theories and practices in sport.

SM 355. Orientation in Sport Management. 1 Hour.
PR: Majors only. In this course students will identify and develop the skill sets necessary for successful completion of an internship in sport management.

SM 370. Sport Finance and Economics. 3 Hours.
The purpose of this course is to provide financial and economic overview of professional, collegiate and recreational sports. Students will learn financial structures of sport organizations and various economic principles applied to the sport industry.

SM 375. Sport in the Global Market. 3 Hours.
An examination of the role of sports within the broader process of globalization. Its impact on culture, politics, economics and how these influences shape today’s sport.

SM 380. History and Philosophy of Sport. 3 Hours.
This course is designed to acquaint students with philosophical issues related to sport and sport management and with individuals and events that helped shape the history of sport.

SM 387. Issues in Sport Studies. 3 Hours.
PR: ENGL 102. An in-depth analysis of critical issues impacting sport and the sport industry.

SM 425. Sport Facility and Event Management. 3 Hours.
PR: Consent. This course is designed to inform students of the principles and practice of planning, funding, and managing of sport facilities and event management.

SM 426. Liability in Sport. 3 Hours.
An overview of the legal system as it applies to sport, including contracts, tort law, drug testing, types of athletes, product liability, and legal duties of coaches, facilities supervisors, and athletic directors.

SM 485. Sport Management. 3 Hours.
PR: Senior standing. The study of management principles as they relate to sport organizations. The analysis includes specific references to planning, organizing, leading and evaluating functions of management in sport.

SM 486. Sport Marketing & Sales. 3 Hours.
PR: BUSA 215 and BUSA 320 and SM 387 and SM 485 and Senior Standing. The study of marketing principles as they relate to sport organizations. Specific attention is focused on the marketing planning process, marketing informational systems, and internal marketing.
SM 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

SM 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

STATISTICS

STAT 211. Elementary Statistical Inference. 3 Hours.
PR: MATH 122 or higher. (Not open to students who have completed STAT 215.) Basic concepts of descriptive and inferential statistics: descriptive measures, random variables, sampling distributions, estimation, tests of hypotheses, chi-square tests, regression and correlation. (Equivalent to ECON 225.)

THEATRE

THET 300. Practicum. 1 Hour.
PR: THET 104 or THET 106 or consent. (May be repeated for a maximum of 4 credit hours.) Assigned independent production projects supervised by a faculty mentor.

WOMEN’S STUDIES

WGST 225. Women in Appalachia. 3 Hours.
Use variety of sources to explore how race, class, ethnicity, sex and gender impact lives of diverse Appalachian women, including portrayal of women, stereotypes, impact of stereotypes, and how women construct their own identities.

WV UNIVERSITY EXPERIENCE

WVUE 191. First Year Seminar. 1 Hour.
Exploration of academic experiences through meaningful contexts. The course will envelope a range of academic components needed to achieve student success and successfully transition to West Virginia University.