MECHANICAL ENGINEERING UNDERGRADUATE ADVISING GUIDE

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Revised 7/22/2013

Bachelor of Science in Mechanical Engineering (BSME)

Mission

Our mission in undergraduate education is to provide the resources and educational opportunities that prepare men and women for careers in Mechanical Engineering practice and research, and to foster the development of the leadership skills that are the basis of effective contributors to society.

Goals/Program Educational Objectives

1. Success in the Profession. Our goal is success for our graduates in industry, research, and academic careers by virtue of skills and attributes learned in our program. The graduates succeed in their professional and academic positions by:
   (a) using fundamental science and analysis to solve engineering problems,
   (b) successfully executing engineering designs, and
   (c) performing effectively in design teams, in the use of management tools, and through effective oral, written and graphical communication.
2. Contribution to society. Graduates should be critical thinkers in the tradition of the broad liberal arts education. They succeed in this goal by being able to:
   (a) think critically, in the sense of broadly educated individuals (i.e., be informed evaluators/consumers of information),
   (b) perform independent, informed analysis on issues inside and outside of technology, and
   (c) continue lifelong learning.

Outcomes

Each Student in the receiving of a BSME degree from the program will demonstrate:

a) An ability to apply knowledge of mathematics, science, and engineering appropriate to the discipline.
b) An ability to design and conduct experiments, analyze and interpret data.
c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
d) An ability to function on multi-disciplinary teams.
e) An ability to identify, formulate, and solve engineering problems.
f) understanding of professional and ethical responsibility.
g) An ability to communicate effectively.
h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
i) A recognition of the need for, and an ability to engage in, life-long learning.
j) A knowledge of contemporary issues.
k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
l) An ability to find and use a variety of modern information resources pertinent to design and engineering problem solving.

Code of Ethics of Engineers

The Fundamental Principles

Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

I. using their knowledge and skill for the advancement of human welfare;

II. being honest and impartial, and serving with fidelity the public, their employers and clients;

III. striving to increase the competence and prestige of the engineering profession; and

IV. supporting the professional and technical societies of their disciplines.

The Fundamental Canons

1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.
2. Engineers shall perform services only in the areas of their competence.
3. Engineers shall issue public statements only in an objective and truthful manner.
4. Engineers shall act in professional matters for each employer or client as faithful agents or trustees, and shall avoid conflicts of interest.
5. Engineers shall build their professional reputation on the merit of their services and shall not compete unfairly with others.
6. Engineers shall act in such a manner as to uphold and enhance the honor, integrity and dignity of the profession.
7. Engineers shall continue their professional development throughout their careers and shall provide opportunities for the professional development of those engineers under their supervision.

DEGREE REQUIREMENTS FOR BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

This guide supplements the University of Washington (UW) General Catalog, Time Schedules, and other announcements about registration. The Bachelor of Science in Mechanical Engineering (BSME) requirements set forth in this guide apply to students entering the BSME Program Autumn Quarter 2013 and thereafter until superseded by a future revision.

Students are responsible for planning their program of studies and for remaining informed of dates, deadlines, rules, and regulations. Students must maintain a University of Washington e-mail account in order to receive communications from professors and the Department of Mechanical Engineering.

A minimum **2.0** cumulative grade point average is required to graduate from the Department of Mechanical Engineering with a BSME degree. In addition, Students must achieve a minimum **2.0** grade in each engineering fundamental and Mechanical Engineering core course.

Mechanical Engineering Academics

General Degree Requirements

The B.S.M.E. program is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone: (410) 347-7700, and as such, all graduates must meet certain specified requirements. A total of **180**-quarter credits are required for the BSME degree at the UW. Regardless of the number of Mechanical Engineering (ME) courses taken at another institution, a minimum of **45** credits in ME courses must be taken in residence at the University of Washington.

VLPA/I&S

The College of Engineering (COE) requires that all degree programs include a minimum of **24** credits of Visual, Literary, and Performing Arts (VLPA) and Individuals and Societies (I&S). Course selection to fulfill the VLPA/I&S requirements must meet the following selection criteria:

- A minimum of **10** credits of VLPA and **10** credits of I&S.
- A total of **24** credits of VLPA/I&S credits.

Foreign language courses at the third quarter level or above (e.g., GERMAN 103) may be applied towards VLPA credits.

Transfer Credit

A maximum of **90** credits may be transferred from a two-year college and a maximum of 135 credits obtained from a four-year ABET-accredited college may be transferred. However, of the courses needed to satisfy departmental requirements for a BSME, some have direct transfer, and others may only be used if approved by the Director of Student Services and Faculty Undergraduate Program Coordinator.
For more information see the UW website at: http://admit.washington.edu/Requirements/Transfer/Plan/CreditPolicies

Advising

The ME Student Services office is located in Mechanical Engineering building (MEB) room 143B for information on course scheduling, general advising on administrative procedures, rules, and regulations. Students are encouraged to utilize the ME Student Services Office for questions regarding other university resources. Additional information may be found on the ME home page at: http://www.me.washington.edu

Scholarships

The College of Engineering and the Department of Mechanical Engineering offer a limited number of academic and need based scholarships. The on line scholarship application is available via the College of Engineering website at: http://www.engr.washington.edu/curr_students/scholarships.html

The Office of Merit Scholarships, Fellowships & Awards (OMSFA) provides UW students with information about merit-based awards and offers workshops on how to search and apply for scholarships. For more information visit their website at: http://www.washington.edu/students/ugrad/scholar/

Graduation
Students should apply for graduation **two** quarters before they wish to graduate. To apply for graduation, students should schedule an advising appointment: meadvise@u.washington.edu. Graduating seniors need to file a degree application two quarters prior to their expected graduation date to qualify for Graduating Senior Priority (GSP) registration. GSP registration allows students to register on the first day of registration Period I.

Computer Facilities
The Department of Mechanical Engineering has computer laboratories equipped with personal computers for ME students to use. There are computers located in MEB 232 and in the Integrated Learning Factory (ILF) design laboratory. The computer support staff is located in MEB 256 during posted office hours to assist with any computer questions or problems. They can be reached at *mehelp@u.washington.edu or* 206-616-1867

Leave
Students should schedule an advising appointment to discuss part-time attendance or the departmental leave policy. Students who withdraw from the University without prior written approval of the department, or are dropped for non-payment of fees, will forfeit their place in the program. Students must reapply for admission and, if re-admitted, must fulfill the requirements in effect at the time of re-admission.

Lockers
Student lockers are located on the second floor of the MEB. To register for a locker, go to the ME Fiscal Office (MEB 143A) to complete the locker registration form. The cost is $5.00 per quarter. Note: if lockers are not renewed for an additional quarter the contents will be removed the week after finals week.

BSMENEWS
BSMENEWS is an email distribution list for all undergraduate Mechanical Engineering students. It is a news list to keep students informed of current events in the Department such as student society meetings, seminars, ME intramural sports, class registration, and program changes.

Mechanical Engineering Special Interest

Engineering Co-op
The Engineering Co-op Program enables students to apply academic theory in a working environment. The program allows students work full time paid employment while earning academic credit. Students may apply up to 4 credits of Co-op (ENGR 321) towards their degree as ME Option credits.
http://www.engr.washington.edu/curr_students/coop/index.html

Engineer-in-Training (EIT) Exam (a.k.a. Fundamentals in Engineering (FE) Exam)
The State of Washington Board of Registration offers the Engineering in Training (EIT) Exam twice a year (October and April). The deadline for the application is **three** months prior to the exam date. For more information on the EIT see the National Society of Professional Engineers website at:
http://www.dol.wa.gov/business/engineerslandsurveyors/elreq.html

ESL Policy

Students who have not completed their English as a Second Language (ESL) requirements must enroll in and satisfactorily complete, with a grade of 3.0 or higher, at least one ESL class each quarter starting with their first quarter in the BSME program, and continue to take an ESL course each quarter until all ESL requirements are completed. Such students are required to also complete a minimum of 10 credits each quarter in non-ESL courses that satisfy the requirements for the BSME degree.

Student Societies
The Department of Mechanical Engineering has several active student chapters that work closely with the Professional Chapters of the organizations listed below. The student chapters offer the opportunity to develop and enhance teamwork, leadership, and organizational skill.

ASHRAE American Society of Heating, Refrigerating, and Air Conditioning Engineers
National: http://www.ashrae.org/ UW Chapter: http://www.pugetsoundashrae.org/uw/

ASME American Society of Mechanical Engineers
http://www.students.washington.edu/asmeuw/
Faculty Advisor, Professor I.Y. (Steve) Shen

Pi Tau Sigma Mechanical Engineering Honorary
Faculty Advisor, Professor Nathan Sniadecki

SAE Society of Automotive Engineers
http://students.washington.edu/~auto/
Faculty Advisor, Professor Ashley Emery

SNAME Society of Naval Architects and Marine Engineers
http://www.me.washington.edu/societies/sname/
Faculty Advisor, Professor Bruce Adee

SWE Society of Women Engineers – College of Engineering organization
http://students.washington.edu/swe/

Tau Beta Pi Engineering Honor Society – College of Engineering organization
http://www.tbp.org/pages/main.cfmFaculty Advisor, Professor Mamidala Ramulu

General Graduation Requirements for Mechanical Engineering

The Department of Mechanical Engineering requires a minimum of 180 credits for graduation.

Mathematics	**(24 cr.)**	
MATH 124, 125, 126	(15 cr.)	Calculus with Analytic Geometry
MATH 307 OR AMATH 351	(3 cr.)	Introduction to Differential Equations
MATH 308 OR AMATH 352	(3 cr.)	Matrix Algebra with Applications
MATH 309 or MATH 324 or AMATH 353	(3 cr.)	Linear Analysis
Physics and Chemistry	**(25 cr.)**	
PHYS 121, 122, 123	(15 cr.)	Mechanics, Electromagnetism and Oscillatory Motion, & Waves
CHEM 142, 152	(10 cr.)	General Chemistry with laboratory
Written and Oral Communication	**(8-12 cr.)**	
English Composition	(5 cr.)	Any course selected from the UW English Composition List
HCDE 231	(3 cr.)	Introduction to Technical Writing
Additional Composition or Writing or ME 354	(4 cr.)	
Engineering Fundamentals	**(31 cr.)**	
AMATH 301	(4 cr.)	Beginning Scientific Computing
AA 210	(4 cr.)	Engineering Statics
EE 215	(4 cr.)	Fundamentals of Electrical Engineering
IND E 315 or MATH 390	(3 cr.)	Probability and Statistics for Engineers
ME 123	(4 cr.)	Introduction to Visualization and Computer-Aided Design
MSE 170	(4 cr.)	Fundamentals of Material Science
CEE 220	(4 cr.)	Introduction to Mechanics of Materials
ME 230	(4 cr.)	Kinematics and Dynamics
Visual, Literary and Performing Arts (VLPA)/ Individuals & Societies (I&S) (formerly Humanities and Social Sciences Sciences)	**(24 cr.)**	A minimum of 10 credits of Visual, Literary and Performing Arts and 10 credits of Individual and Societies
ME Core Courses	**(45 cr.)**	
ME 323	(5 cr.)	Engineering Thermodynamics
ME 331	(4 cr.)	Introduction to Heat Transfer
ME 333	(5 cr.)	Introduction to Fluid Mechanics
ME 354 (W)	(5 cr.)	Mechanics of Materials Lab
ME 355	(4 cr.)	Manufacturing Processes
ME 356	(4 cr.)	Machine Design Analysis
ME 373	(5 cr.)	Introduction to System Dynamics
ME 374	(5 cr.)	System Dynamic Analysis/Design
ME 395	(4 cr.)	Introduction to Mechanical Design
ME 495	(4 cr.)	Mechanical Engineering Design
Free Elective	(4 cr.)	
ME Option Courses	**(19 cr.)**	
Total Credits Required for Graduation	**(180 cr.)**	

Mechanical Engineering Sample Schedule I

First Year - Pre Engineering

MATH 124	(5)	MATH 125	(5)	MATH 126	(5)
CHEM 142	(5)	CHEM 152	(5)	PHYS 121	(5)
ENGL. COMPOSITION	(5)	VLPA / I&S	(5)	VLPA / I&S or ME 123	(5)
Quarter Total	**(15)**	**Quarter Total**	**(15)**	**Quarter Total**	**(15)**

Year Total (45)

Second Year - Pre Engineering

MATH 307 or AMATH 351	(3)	PHYS 123	(5)	CEE 220	(4)
PHYS 122	(5)	MATH 308 or AMATH 352	(3)	HCDE 231	(3)
AA 210	(4)	ME 230	(4)	AMATH 301	(4)
ME 123	(4)			VLPA / I&S	(5)
Quarter Total	**(16)**	**Quarter Total**	**(12)**	**Quarter Total**	**(16)**

Year Total (44)

Third Year - Mechanical Engineering

MSE 170	(4)	ME 333	(5)	ME Option	(4)
EE 215	(4)	ME 354	(5)	ME 355 or ME 356	(4)
ME 323	(5)	ME 373	(5)	ME 374	(5)
				IND E 315/Math 390	(3)
Quarter Total	**(13)**	**Quarter Total**	**(15)**	**Quarter Total**	**(16)**

Year Total (44)

Fourth Year - Mechanical Engineering

MATH 309 or 324 or AMATH 353	(3)	ME Option	(4)	ME Option	(4)
ME 331	(4)	ME 355 or ME 356	(4)	ME 495	(4)
ME 395	(4)	Free Elective	(4)	VLPA / I&S	(4)
VLPA/ I&S	(5)	ME Option	(4)	ME option	(3)
Quarter Total	**(16)**	**Quarter Total**	**(16)**	**Quarter Total**	**(15)**

Year Total (47)

Total=180 credits

NOTE: Courses are subject to change. It is the responsibility of the student to check with an ME academic counselor for up-to-date course offering information.

Mechanical Engineering Sample Schedule II

First Year - Pre Engineering

MATH 124	(5)	MATH 125	(5)	MATH 126	(5)
CHEM 142	(5)	CHEM 152	(5)	PHYS 121	(5)
ENGL. COMPOSITION	(5)	VLPA / I&S	(5)	ME 123 VLPA / I&S	(4) (2)
Quarter Total	**(15)**	**Quarter Total**	**(15)**	**Quarter Total**	**(16)**

Year Total (46)

Second Year - Pre Engineering

MATH 307 or AMATH 351	(3)	PHYS 123	(5)	MSE 170	(4)
PHYS 122	(5)	AMATH 301	(4)	CEE 220	(4)
HCDE 231	(3)	VLPA / I&S	(3)	EE 215	(4)
AA 210	(4)	ME 230	(4)	IE 315	(3)
Quarter Total	**(15)**	**Quarter Total**	**(16)**	**Quarter Total**	**(15)**

Year Total (46)

Third Year - Mechanical Engineering

ME 354	(5)	ME 323	(5)	ME 333	(5)
Free Elective	(4)	ME 355 or ME 356	(4)	ME 395	(4)
MATH 308 or AMATH 352	(3)	ME 373	(5)	ME 374	(5)
ME Option	(4)				
Quarter Total	**(16)**	**Quarter Total**	**(14)**	**Quarter Total**	**(14)**

Year Total (44)

Fourth Year - Mechanical Engineering

ME Option	(4)	ME 355 or ME 356	(4)	ME Option	(3)
ME 331	(4)	MATH 309 or 324 or AMATH 353	(3)	ME Option	(4)
VLPA / I&S	(5)	VLPA / I&S	(5)	ME 495	(4)
		ME Option	(4)	VLPA / I&S	(4)
Quarter Total	**(13)**	**Quarter Total**	**(16)**	**Quarter Total**	**(15)**

Year Total (44)

Total=180 credits

NOTE: Courses are subject to change. It is the responsibility of the student to check with an ME academic counselor for up-to-date course offering information.

Engineering Fundamentals and ME Professional Program Courses
Autumn 2012-Spring 2013

(all courses are required)

Mechanical Engineering Course Syllabi Information is available on the ME website at: http://www.me.washington.edu/courses/abet/

A A 210 Engineering Statics (4)
Vector analysis applied to equilibrium of rigid body systems and subsystems. Force and moment resultants, free body diagrams, internal forces, and friction. Analysis of basic structural and machine systems and components. Prerequisite: either MATH 126, MATH 129, or MATH 136; PHYS 121; recommended: graphics background. Offered: AWS.

CEE 220 Introduction to Mechanics of Materials (4) Introduction to the concepts of stress, deformation, and strain in solid materials. Development of basic relationships between loads on structural and machine elements such as rods, shafts, and beams, and the stresses, deflections, and load-carrying capacity of these elements under tension, compression, torsion, bending and shear forces, or combinations thereof. Prerequisite: AA 210. Offered: WSpS.

AMATH 301 Beginning Scientific Computing (4) Introduction to the use of computers to solve problems arising in the physical, biological and engineering sciences. Application of mathematical judgment, programming architecture, and flow control in solving scientific problems. Introduction to MATLAB routines for numerical programming, computation, and visualization. Prerequisite: either MATH 125, Q SCI 292, MATH 128, or MATH 135. Offered: AWSpS.

E E 215 Fundamentals of Electrical Engineering (4) NW
Introduction to electrical engineering. Basic circuit and systems concepts. Mathematical models of components. Kirchoff's laws. Resistors, sources, capacitors, inductors, and operational amplifiers. Solution of first and second order linear differential equations associated with basic circuit forms. Prerequisite: either MATH 126, MATH 136; PHYS 122. Offered: AWSpS

IND E 315 Probability and Statistics for Engineers (3)
Application of probability theory and statistics to engineering problems, distribution theory and discussion of particular distributions of interest in engineering, statistical estimation and data analysis. Illustrative statistical applications may include quality control, linear regression, and analysis of engineering data sets. Prerequisite: either MATH 136 or MATH 307. Offered: AWSpS.

MSE 170 Fundamentals of Material Science (4) Fundamental principles of structure and properties of materials utilized in practice of engineering. Properties of materials are related to atomic, molecular, crystalline structure. Metals, ceramics, multiphase systems, and polymeric materials. Relationships between structure and electrical, mechanical, thermal, chemical properties. For advanced freshmen and sophomores. Prerequisite: either CHEM 150, CHEM 152, or CHEM 155. Offered: AWSpS

ME 123 Introduction to Visualization and Computer-Aided Design (4)
Methods of depicting three-dimensional objects and communicating design information. Development of three-dimensional visualization skills through freehand sketching and computer-aided design using parametric solid modeling. Offered: AWSpS

ME 230 Engineering Kinematics and Dynamics (4)
Kinematics of particles, systems of particles, and rigid bodies; moving reference frames; kinetics of particles, systems of particles, and rigid bodies; equilibrium, energy, linear momentum, angular momentum, Euler equations, and special problems (e.g., central force motion, vibration). Prerequisite: AA 210. Offered: WSpS

ME 323 Engineering Thermodynamics (5) Applications of thermodynamic principles: properties of pure substances from an advanced point of view, nonreactive gas mixtures, energy analysis of reactive mixtures, chemical equilibria, combustion, power, refrigeration cycle analysis. Prerequisite: Chem 142, Math 126, Physics 121. Offered: AW

ME 331 Introduction to Heat Transfer (4) Study of heat transfer by conduction, radiation, and convection; elementary heat-exchanger design. Prerequisite: ME 333 or CEE 342. Offered: ASpS

ME 333 Introduction to Fluid Mechanics (5) Introduction to the basic fluid laws and their application. Conservation equations, dynamic similarity, potential flow, boundary layer concepts, effects of friction, compressible flow, fluid machinery, measurement techniques. Prerequisite: AMATH 301, ME 323 and either MATH 307 or AMATH 351. Offered: WSp

Note: Course offerings are subject to change. It is the responsibility of the student to check with the ME Student Services office for up-to-date course offering information.

ME 354 Mechanics of Materials Laboratory (5) Study of the properties and behavior of engineering materials including stress-strain relations, strength, deformation mechanisms, fracture, creep, and cyclic fatigue. Introduction to experimental techniques common to structural engineering, interpretation of experimental data, comparison of measurements to numerical/analytical predictions, and formal, engineering report writing. Lecture and laboratory. Prerequisite: MSE 170 and CEE 220. Offered: AW.

M E 355 Introduction to Manufacturing Processes (4) Study of manufacturing processes, including interrelationships between the properties of the material, the manufacturing process and the design of components. Interpretation of experimental data, comparison of measurements to numerical/analytical predictions, and formal, engineering report writing. Prerequisite: ME 354. Offered WSp.

ME 356 Machine Design Analysis (4) Analysis, design, and selection of mechanical and electromechanical subsystems and elements such as gears, linkages, cams, and bearings. Lecture and laboratory. Prerequisites: ME 354. Offered: WSp.

ME 373 Introduction to System Dynamics (5)
Mathematical modeling, analysis, and design of physical dynamic systems involving energy storage and transfer by lumped-parameter linear elements. Time-domain response by analytical methods and numeric simulation. Laboratory experiments. Prerequisite: either AMATH 351 or MATH 307; either AMATH 352 or MATH 308; E E 215; M E 230. Offered: W.

ME 374 Systems Dynamic Analysis and Design (5)
Extension of M E 373. Frequency response analysis, generalized impedance concepts and applications, Fourier series analysis and Laplace transform techniques. Modeling and analysis of electromechanical actuators and rotating machinery. Laboratory experiments and design projects. Prerequisite: AMATH 301, ME 373. Offered: Sp.

ME 395 Introduction to Mechanical Design (4) Design process and methodology; decision making; optimization techniques; project planning; engineering economics; probabilistic and statistical aspects of mechanical design; ethical and legal issues. Lecture and laboratory. Prerequisites: ME 123, ME 323, and IND E 315 or Math 390 either of which may be taken concurrently. Offered: ASpS

ME 495 Mechanical Engineering Design (4) Design laboratory involving the identification and synthesis of engineering factors to plan and achieve specific project goals. Current literature and prerequisite texts are used as reference sources. Lecture and laboratory Prerequisite: M E 395. Offered: AWSp.

Note: Course offerings are subject to change. It is the responsibility of the student to check with the ME Student Services office for up-to-date course offering information.

ME Option Courses Autumn 2013-Spring 2014

(19 credits are required)

Mechanical Engineering Course Syllabi Information is available on the ME website at: http://www.me.washington.edu/courses/abet/

The BSME requirements include a minimum of 19 credits of ME Option courses. These courses are designed for seniors, and most require many of the 300-level courses as prerequisites. Maximum of 6 credits of ME 499; By petition process, up to 3 credits of 300 or 400 level College of Engineering (COE) technical courses may be applied; 4 credits of ENGR Co-op credits may be applied to satisfy the 19 credits of ME Option required. ME required classes will not count for ME Option credit, nor will an equivalent to a ME required class in another COE Department (e.g., CEE 342 for ME 333).

Non-ME Courses as ME Option
Occasionally students wish to substitute a 300 or 400 – level course offered by another College of Engineering department for ME Option course credits. By petition, up to 3 credits of a 300 or 400 –level class offered by another engineering department and up to 4 credits of ENGR 321 (Engineering Co-op Credit), may be applied to satisfy the 19 credits required of ME Option

M E 409 Introduction to Numerical Control and Computer-Aided Manufacturing (3) *Ramulu*
Control system fundamentals, numerical control (NC) machine control systems, and the design aspect of NC machine tools, programming methods of NC machines, computer-aided manufacturing, CNC, DNC, and process optimization. Prerequisite: M E 355 which may be taken concurrently. Offered: A.

M E 410 Nanodevices: Design and Manufacture (3) *Chung* Examines design, fabrication, and manufacture of nano devices with state-of-the-art nanotechnology. Covers classification and selection of nanoscale materials and manufacturing methods: Includes nanodevice design projects. Offered: A.

M E 411 Biological Frameworks for Engineers (3) *Sniadecki* Introduces the fundamentals of biology for an engineer. Covers mechanisms and biomechanics of DNA, proteins, cells, connective tissue, musculoskeletal tissue, and cardiovascular tissue, integration principles of living systems, structure-function relationships, and techniques to study biology and medicine, and tissue engineering. Offered: A.

ME 415 Sustainability and Design for Environment: Products for a clean future (3) *Cooper* Analysis and design of technology systems within the context of the environment, economy, and society. Applies concepts of resourses conservation, pollution prevention, life cycle assessment, and extended product responsibility. Examines the practice, opportunities, and role of engineering, management, and public policy. Offered: jointly with ENVIR 415/CEE 495. Offered Sp

ME 425 HVAC Engineering (4) *Emery* Heating, ventilating and air conditioning of the built environment. Human comfort, psychometric processes, load computations, fluid distribution, and controls. Design analysis of HVAC systems is taught in the lecures and applied in the class project. Prerequisites: ME 323, ME 331. Offered: Sp.

ME 426 Sustainable Energy Design (3) *Malte* Energy systems with renewable energy and efficient use of energy. Project-based learning: analysis, systems engineering, design, component characteristics, and environmental impacts. Prerequisite: M E 333. Offered: Sp.

ME 430 Advanced Energy Conversion Systems (4) *Kramlich* Advanced and renewable energy conversion systems and technologies are treated. Included are high efficiency combined cycles; renewable energy conversion involving solar, wind, and biomass; direct energy conversion and fuel cells; and nuclear energy. Environmental consequences of energy conversion and environmental control are discussed. Prerequisite: M E 323. Offered: A.

ME 431 Advanced Fluid Mechanics (4) *Mescher* Advanced topics in fluid mechanics, including kinematics, potential theory and vortex dynamics, viscous flow, turbulence, experimental and numerical methods and design. Prerequisite: ME 333. Offered: A.

ME 440 Advanced Mechanics of Materials and Solids (3) Study of mechanics of deformable bodies, including three-dimensional stress and strain tensors and their transformations. Equations of compatibility, continuity and equilibrium. Elastic constants. Failure criteria including fracture, yield and instability. Deflection relations for complex loading and shapes. Indeterminate problems. Design applications and numerical methods. Prerequisites: ME 354. Offered Sp.

M E 442 Renewable Energy (4) Introduction to renewable energy. Principles and practices: solar, wind, water, and biomass energy conversion. Prerequisite: either MATH 112, MATH 124, or Q SCI 291; either CHEM 120, CHEM 142, PHYS 115, or PHYS 122. Offered: jointly with CHEM E 442/ENVIR 442. Offered: W.

M E 445 Introduction to Biomechanics (4) *Sanders* Presents the mechanical behavior of tissues in the body and the application to design of prostheses. Tissues studies include bone, skin, fascia, ligaments, tendons, heart valves, and blood vessels. Discussion of the structure of these tissues and their mechanical response to different loading configurations. An important part of the class is a final project. Offered: jointly with BIOEN 440. Offered: Sp

ME Option Courses Autumn 2013-Spring 2014

ME 450 Introduction to Composite Materials and Design (3) *Tuttle* Stress and strain analysis of continuous fiber composite materials. Orthotropic elasticity, lamination theory, failure criteria, design philosophies, as applied to structural polymeric composites. Recommended: MSE 475. Offered: W

ME460 Kinematics and Linkage Design (3) *Ganter* Synthesis of linkage-type mechanisms using graphical and computer methods. Instructor Course Description:*Ganter* Offered: A

M E 461 Mechanics of Thin Films (3) *Wang*
Provides an overview of the thin film deposition processes; the stress and microstructure development during film growth; the mechanisms of adhesion; delamination and fracture; and the state-of-the-art characterization techniques for the microstructure and mechanical properties of thin films, coatings, and nanomaterials. Offered: A.

ME 469 Applications of Dynamics in Engineering (4) *Storti* Application of the principles of dynamics to selected engineering problems, such as suspension systems, gyroscopes, electromechanical devices. Includes introduction to energy methods, Hamilton's principle and Lagrange's equation, and the design of dynamic systems. Prerequisites: ME 374. Offered: N/A.

ME 470 Mechanical Vibrations (3) *Reinhall* Single-degree-of-freedom linear systems techniques. Matrix techniques for multi-degree-of-freedom linear systems techniques. Applications in vibration isolation, transmission, and absorption problems and instrumentation. Prerequisite: ME 373. Offered: W.

ME 471 Automatic Control (4) *Berg* Dynamic system modeling; control system stability and performance analysis: compensator design by Bode and root-locus methods. Prerequisite: ME 374. Offered: A.

ME 473 Instrumentation (4) *Garbini* Principles and practice of industrial measurement. Dynamics of instrument response; generalized performance analysis of sensor systems; theory of transducers for motion, force, pressure, flow, and other measurements. Lecture and laboratory. Prerequisite: ME 374. Offered A.

ME 474 Systems Modeling and Simulation (3) *Fabien* Unified approach to modeling of systems, and computer simulation of systems behavior. Selecting system variables; writing state, loop, and node equations; modal response and state transition response; system functions and convolution; analogs. Application to control, vibrations, and other problems. Prerequisite: ME 374. Offered: N/A

ME 477 Embedded Computing in Mechanical Systems (4) *Garbini* Analysis of electromechanical systems employing microcomputers for control or data acquisition. Microcomputer architecture, memory organization, C language programming, interfaces, and communications. Particular emphasis on design of hardware and software interfaces for real-time interaction with mechanical systems. Weekly laboratory. Prerequisites: ME 374. Offered: W.

ME 478 Finite Element Analysis (4) *Labossiere, Reinhall* Development of theory and concepts of finite element analysis. Applications in all areas of mechanical engineering, including mechanics of solids, heat transfer, and design of dynamical systems. Weekly computer exercises. Prerequisites: ME 123, ME 374, and MATH 308 or AMATH 352. Offered: ASp.

ME 480 Introduction to Computer-Aided Technology (4) *Ganter* Principles of computer-aided technology. Computer-aided design, engineering, drafting, and manufacturing; computer-aided design systems, geometry, computer graphics, hardware, computer-aided vehicle/system design synthesis. System demonstrations, laboratories, and site visits. Prerequisites: ME 123 and AMATH 301. Offered: ASp.

ME 498 Special Topics in Mechanical Engineering (1-5, variable credit) Lecture and/or laboratory. This special topics course may be counted as an ME option class. Prerequisite: Permission of instructor. Offered: AWSp.

ME 498F FSAE Special Topics (1 credit) Prerequisite: Freshmen, Sophomore or Junior Offered: AWSp.

ME 499 Special Projects (2-5, variable credit, ME option max 6) Written report required. (Only graded courses may be used to fulfill ME Option credits. **Maximum** of 6 credits count for ME option) Offered: AWSp.

Note: Course offerings are subject to change. It is the responsibility of the student to check with the ME Student Services office for up-to-date course offering information.

Appendix I

Continuation Policy

While the University has general regulations governing scholastic eligibility for continuation, departments and programs in the College of Engineering have adopted additional requirements in order to make the best use of limited facilities and resources available, and to provide reasonable assurance of academic success. The following criteria and procedures will be applied to all undergraduate students.

I) Basic Criteria

A nominal average of 16 hours/quarter is required to complete graduation requirements in the conventional 12 quarters.

1. Full-time students are expected to complete 12 or more credit hours per academic quarter applicable toward the degree requirements to be considered as a full-time student. This rule is interpreted by the Mechanical Engineering Department to mean that failure to meet the 12-credit requirement for two consecutive quarters will result in automatic transfer out of the Department and the College of Engineering. The requirement of 12 credits per quarter is met when the student completes 24 applicable credits in any two consecutive quarters. Summer Quarter is not counted.

2. Part-time attendance is possible subject to departmental approval. Written permission must be obtained each quarter from the advisor. An application for part-time status must be made prior to the first day of each quarter. Students who have received permission to attend part-time should complete a minimum of six credits each quarter applicable towards their degree.

3. A student who withdraws from the University without prior written approval or is dropped for non-payment of fees must obtain approval of the departmental Undergraduate Advisor before registering or maintaining pre-registration for the following academic quarter. In such cases the department registration may be disallowed or canceled if the student's academic record is inferior to the level of admission prevailing at the time.

4. All undergraduate students who have exceeded by more than 10 credits the requirements of the BSME degree program will be transferred to the College of Arts and Sciences.

5. The grade-point average in all departmental and professional program courses must not fall below 2.00. The grade point average is computed by considering all professional program courses, including repeated courses. If the grade point average in these courses falls below 2.00, a student will be placed on departmental probation and must achieve a quarterly grade point average above 2.00 the following quarter or be transferred out of the Department and the College of Engineering.

II) Review and Notification Procedure

The progress of each student will be reviewed on a regular basis. If a student fails to meet the standards outlined above, that student will be placed on probation the following quarter, and the student will be notified in writing of the reason for probation. If the student does not show satisfactory progress in the following quarter, the student will be notified in writing, dropped from the Department of Mechanical Engineering and will be transferred to the College of Arts and Sciences. Failure to notify the student does not nullify the termination.

III) Appeals Procedure

The departments of the College recognize that inequities can result from any continuation policy. Therefore, a student who has been placed on probation or has been dismissed and believes that some facts in the record have been overlooked or misinterpreted, may request reconsideration of the probation dismissal by writing a letter to the Mechanical Engineering Chair. Included in the letter should be any additional information in support of the student or any other information that the student believes is relevant. The appeal must be made within 30 days of the notification of placement on probation or dismissal. A response to the appeal will be made within 30 days.

IV) Academic Misconduct

Academic misconduct encompasses plagiarism, cheating on examinations or on individual project assignments, and theft or alteration of other people's work on academic materials for the purpose of improving one's own grades or acquiring academic credit. Students accused of academic misconduct will be referred for disciplinary action pursuant to the Student Conduct Code of the Washington Administrative Code 478-120, and if found guilty are subject to sanctions. As a function of the seriousness of such misconduct, sanctions range from a disciplinary warning to immediate dismissal from the College of Engineering and the University of Washington. The latter can and has been applied even for first offense.

Appendix II

College of Engineering Policy on Academic Misconduct

Academic misconduct or violation of Engineering Ethics is unacceptable in the practice of engineering. When you graduate and practice as an engineer, you will be subject Code of Ethics of Engineers. While preparing to be an engineer, you are subject to specific rules regarding Academic Misconduct.

Academic misconduct encompasses plagiarism, cheating on examinations or on individual project assignments, fraud, and theft or alteration of other people's work on academic materials for the purpose of improving one's own grades or acquiring academic credit. Students accused of academic misconduct will be referred for disciplinary action pursuant to the University of Washington Student Conduct Code, and if found guilty are subject to sanctions. These sanctions range from disciplinary warning (which encompasses a grade of zero on the assignment/exam in question) to recommending dismissal from the College of Engineering and from the University of Washington.

The College expects all students to behave in a mature manner and to be responsible for their own actions. The College does not accept excuses for misconduct and will prosecute all allegations of misconduct according to the procedures outlined in the College of Engineering Academic Misconduct Process.

What is Cheating?

Most academic misconduct falls under the definition of plagiarism (see below), but sometimes we refer to misconduct as cheating. The following is a list of several examples of cheating:

Examples of Cheating:

- Allowing another to prepare an assignment for you or preparing an assignment for another.
- Having another take an examination for you or taking an examination for another.
- Obtaining information about an examination or assignment that is not authorized by the instructor.
- Altering an answer to an examination after it has been turned in, whether it has been graded or not.
- Looking at another's paper during an examination or allowing another to look at your paper.
- Collaborating with another during examination or on an assignment where the work is to be done independently.
- Bringing materials or information to an examination that are not permitted by the instructor.

What is Plagiarism?

Plagiarism is taking someone else's work from any source, i.e., someone's ideas, writings, or inventions, and using it WITHOUT ACKNOWLEDGMENT. As long as you give credit to the originator of the material, you are not guilty of plagiarism. Merely enclosing statements or sentences in quotation marks is not sufficient; you must cite the source.

Examples of Plagiarism:

- Copying phrases, sentences, sections, paragraphs, or graphics from a source and not giving credit by citing the source.
- Turning in a paper from a previous class.
- Having another person write an assignment (for pay or for free) and putting your name on it.
- Modifying or paraphrasing another's ideas or writings and submitting them as your own.
- Having someone make substantial editorial changes to your paper and submitting the final version as your own.
- Turning in someone else's solution to an exam or a question on an exam as your own.
- Sharing computer code in assignments for individual students; use of someone else's computer code without acknowledgement; use of some one else's computer code when it is prohibited by the instructor.

Examples that are not Plagiarism:

- Asking someone to read your assignment and suggest possible improvements, unless specifically forbidden by the instructor.
- Getting together with other students to discuss an assignment, unless specifically forbidden by the instructor.
- Asking your instructor for help with an assignment.
- Quoting extensively from another's work but giving credit.
- Not citing sources for information that are in dictionaries or your course textbook.

Why is it so important?

Copying (or plagiarizing) someone's work, without giving due recognition, is regarded as the equivalent of STEALING AND FRAUD, especially in the Western world (USA, Canada, and Europe). It is highly probable that it will be detected, so do not do it under any circumstances. It could ruin your career.

How can I avoid Plagiarism?

ALWAYS make very clear reference to the source of the material you use and put the material taken in "quotation marks," no matter where you find it. This is perfectly acceptable and legitimate. DO NOT try to rewrite or change another person's work and pass it off as your own - this is very difficult to do and is easily detected.

When can I use other people's work?

You can always use published writings as long as you give a formal reference and acknowledgment of the source. If the information comes from a conversation with a professor or another student, give their name and recognition that it is their thought.

Again, NEVER take another person's writing or speech or message or Internet data and put it in your work without acknowledgment. It is important to always make sure in your career that everyone who makes a contribution gets credit, no matter how small their part has been!

If you have questions, please check with your instructor or TA.

What can happen if I commit Plagiarism?

At a MINIMUM the Professor will give you a very poor grade and may report the incident to the Associate Dean in the College of Engineering. You will then certainly receive a formal reprimand from the Dean, at a MINIMUM. Please refer to the Student Conduct Code of the Washington Administrative Code for a list of the possible sanctions that may be imposed.

It is foolish and completely unnecessary to plagiarize - DO NOT DO IT!

Questions about Cheating/Plagiarism

If you have any questions about the above process, please check with your instructor, TA, or departmental advising center.

Appendix III

QUARTERLY SCHEDULE WORKSHEET

AUTUMN		WINTER		SPRING		SUMMER	
Course	Cr	Course	Cr	Course	Cr	Course	Cr
Quarter Total		Quarter Total		Quarter Total		Quarter Total	

AUTUMN		WINTER		SPRING		SUMMER	
Course	Cr	Course	Cr	Course	Cr	Course	Cr
Quarter Total		Quarter Total		Quarter Total		Quarter Total	

AUTUMN		WINTER		SPRING		SUMMER	
Course	Cr	Course	Cr	Course	Cr	Course	Cr
Quarter Total		Quarter Total		Quarter Total		Quarter Total	

AUTUMN		WINTER		SPRING		SUMMER	
Course	Cr	Course	Cr	Course	Cr	Course	Cr
Quarter Total		Quarter Total		Quarter Total		Quarter Total	

CURRICULUM COMPLETION SUMMARY

A total of 180 credits are required for completion of the BSME degree.

MATHEMATICS:
Required (24 cr. min.)

*MATH 124	(5)	_____
*MATH 125	(5)	_____
*MATH 126	(5)	_____
♦MATH 307 or AMATH 351	(3)	_____
MATH 308 or AMATH 352	(3)	_____

Students may select one of the following Recommended classes to complete the Remaining 3 MATH credits:

MATH 309	(3)	_____
MATH 324	(3)	_____
AMATH 353	(3)	_____
_____	( )	_____
_____	( )	_____

MECHANICAL ENGR:
Required (45 cr.)

ME 323	(5)	_____
ME 333	(5)	_____
ME 331	(4)	_____
ME 354 (W)	(5)	_____
ME 355	(4)	_____
ME 356	(4)	_____
ME 373	(5)	_____
ME 374	(5)	_____
ME 395	(4)	_____
ME 495	(4)	_____

NATURAL SCIENCES:
Required (25 cr.)

*CHEM 142	(5)	_____
*CHEM 152	(5)	_____
*PHYS 121	(5)	_____
*PHYS 122	(5)	_____
PHYS 123	(5)	_____

WRITTEN COMMUNICATIONS:
Required (8-12 cr.)

*Engl Comp	(5)	_____
HCDE 231	(3)	_____
Additional composition or Writing or ME 354 (W)	(4)	_____

GENERAL ENGINEERING:
Required (31 cr.)

ME 123	(4)	_____
AMATH 301	(4)	_____
MSE 170	(4)	_____
*AA 210	(4)	_____
EE 215	(4)	_____
*CEE 220	(4)	_____
*ME 230	(4)	_____
IND E 315 or MATH 390	(3)	_____

ME OPTIONS:
Required (19 cr.)

_____	( )	_____
_____	( )	_____
_____	( )	_____
_____	( )	_____
_____	( )	_____
_____	( )	_____
_____	( )	_____

VISUAL, LITERARY, and PERFORMING ARTS (VLPA) 24 Credits REQUIRED

Visual, Literary, and Performing Arts (VLPA)
formerly Humanities
(10 cr. min.)

_____	( )	_____
_____	( )	_____
_____	( )	_____
_____	( )	_____
_____	( )	_____

Individuals and Societies (I&S)
formerly Social Sciences
(10 cr. min.)

_____	( )	_____
_____	( )	_____
_____	( )	_____
_____	( )	_____
_____	( )	_____

**Courses required for admission to the Department of Mechanical Engineering*

♦Recommended for admission to the Department of Mechanical Engineering