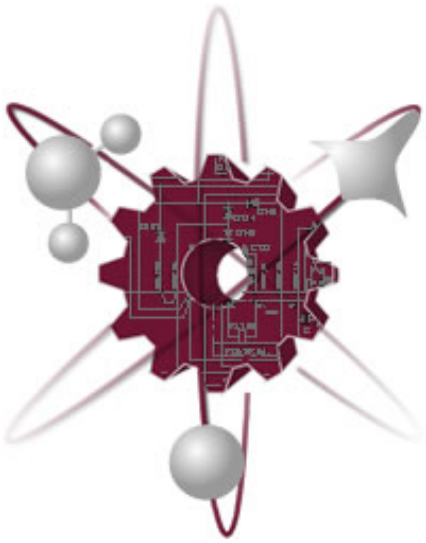
Appendix A: Syllabi

Engineering Physics

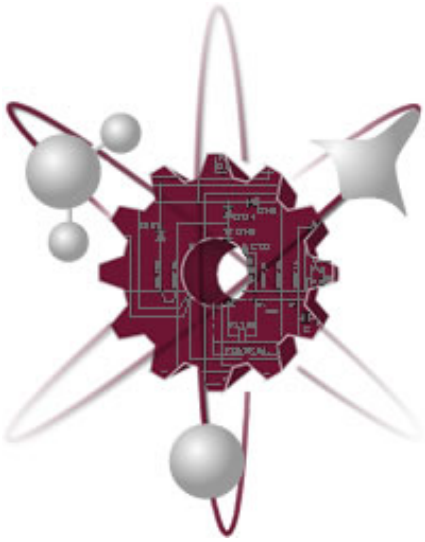
Bachelor of Science in Engineering Physics



Self-Study Report

New Mexico State University

Mechanical Engineering Courses



Course Information	**ME 102 Mechanical Engineering Orientation** 1 credits Required Spring 2012
INSTRUCTOR:	Robert Nichols Phone: 527-7610 email: nicholsr@nmsu.edu
ASSISTANTS:	NA
OFFICE HOURS:	by email
CATALOG DESCRIPTION:	Emphasis on tours of M E labs and NMSU facilities that illustrate possible career paths for mechanical engineers. Students are introduced to department faculty, student organizations, and support services at NMSU. Topics include role of good communication skills, using modern technology, team building, and intellectual property. Students are advised in planning balance of their academic program. Restricted to majors.
PREREQUISITES:	None
TEXT:	*None*
CLASS SCHEDULE:	Lecture: 11:45 a.m. - 12:35 p.m. - R - JH 209
GRADES:	Attendance 50% Projects & report 50%
COURSE OBJECTIVES:	• Introduce students to the NMSU Mechanical & Aerospace Engineering College, Including Faculty and Staff • Expose students to a career and learning opportunities in mechanical engineering. • Teach the student individually learn on their own if required to obtain an answer. • Provide students exposure to the basic principles with hands-on design and testing • Expose the student to a team environment to learn problem solving and find success as a team. • Try to give the student basic tools to help to be successful in future classes and life.
TOPICS COVERED:	• Practical rules for rounding and presentation of results • ME Faculty, Student Organizations, Available Resources • "What is a Mechanical Engineer", Dr. Floyd Adams • WSMR Shock & Vibration, Jeffery Dallman • Engineering Law, Ethics & Economics
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	B ability to formulate, analyze, and creatively participate in the solution of multidisciplinary problems through use of modern engineering D skills needed to fulfill professional duties and responsibilities in teamwork, collegiality, ethics, technical leadership, etc.
RELATIONSHIP TO PROGRAM OUTCOMES:	c ability to design a system, component or process to meet desired needs within realistic constraints

Course Information	**ME 102 Mechanical Engineering Orientation** 1 credits Required Spring 2012
	f understanding of professional and ethical responsibility
POLICIES:	**Attendance** • No more than 2 absences are permitted without affecting your grade. • Absences 1&2 will be -1 Pts each; 3&4: -2 Pts each; 5&6: -3 Pts each; 7 and above: 5 Pts each. • You are required to sign an attendance sheet for each class. **Projects** • At the least there will be a static data collection & calculation project worth 10 Pts. • A data system definition project worth 10 Pts. • A basic dynamics measurement calculation project worth 10 Pts. • An extended dynamic measurement calculation project worth 10Pts. • A Dynamic System definition extension project worth 10 Pts. • Late submission of a project may result in point reduction. **Team & Individual Efforts** • Students are encouraged to work in teams and to compare efforts & results. All reports however will be submitted by the individual students and must be the personal work of the student. Hardcopy reports are expected and quality of the report will be evaluated. Submissions via e-mail will not be accepted. • All reports become the sole property of the instructor and will not be returned. You should keep a copy. • If there are question about the data presented you may be asked to submit an electronic version of the report, data collected, calculated, or presented.
AUTHOR/DATE:	R. Nichols January 2012

Course Information	**ME 159 Graphical Communication and Design** 2 credits Required Spring 2012
INSTRUCTOR:	James Vennes Office: JH20 Phone: 646-3375 email: jvennes@nmsu.edu
ASSISTANTS:	TBA
OFFICE HOURS:	MWF or by appointment
CATALOG DESCRIPTION:	Sketching and orthographic projection. Covers detail and assembly working drawings, dimensioning, tolerance specification, and design projects.
PRE/COREQUISITES:	Math 190
TEXT:	*NX 7 for Designers, Sham Tickoo, CADCIM Technologies, 2009* This is a Blackboard course – Go to https://my.nmsu.edu - NMSU Bookmarks Blackboard OR use https://learn.nmsu.edu directly in the web browser.
CLASS SCHEDULE:	Lecture: 1:10 p.m. - 2:10 p.m. - T - JH 604 Section M01 Lab: 2:10 p.m. - 5:00 p.m. - T - JH 604 Lecture: 1:30 p.m. - 2:20 p.m. - W - JH 604 Section M02 Lab: 2:30 p.m. - 5:20 p.m. - W - JH 604 Lab Hours Outside of Class for Doing Homework: 8:00 a.m. – 5:00 p.m. - Jett Hall 21 5:00 p.m. – 10:00 p.m. - Jett Hall 604
GRADES:	Quizzes: 10% Final Project: 10% Labs/Homework: 20% (possible +8% with Extra Credit)
COURSE OBJECTIVES:	• The student will become familiar with 3-D, featured based, parametric solids modeling as a design tool in mechanical engineering. (ME4) • The student will become familiar with the practices and procedures used to produce and read engineering working drawings. • The student will become familiar with computers from an historical, software, and

Course Information	**ME 159 Graphical Communication and Design** 2 credits Required Spring 2012
	hardware perspective as they are used in mechanical engineering. • The student will become familiar with the general principles of computer aided design and drafting (CADD), and be reasonably proficient in the use of one modern CADD software package – Unigraphics NX from Siemens Corporation. (k)
TOPICS COVERED:	<u>Using Unigraphics NX</u> • Feature-based solids modeling – creation of basic and intermediate features • NX as a design tool - building design intent into models • Assembly modeling • Creating engineering drawings of parts and assemblies <u>Practices and Procedures Used to Produce Engineering Drawings</u> • Creating 2D orthographic drawings of 3D objects – standard views, required views, placement, etc. • Required drawing dimensions – identify features, decide how many dimensions, etc. • Good dimensioning practices – where paced in drawing? How should they look? • Reading engineering drawings – using 2D orthographic views and dimensions to infer 3D shape
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	A mastery of the fundamentals of mechanical engineering B ability to formulate, analyze, and creatively participate in the solution of multidisciplinary problems through use of modern engineering
RELATIONSHIP TO PROGRAM OUTCOMES:	c ability to design a system, component or process to meet desired needs within realistic constraints k ability to use the techniques, skills and modern tools necessary for engineering practice
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME4 ability to work professionally in both thermal and mechanical systems areas
AUTHOR/DATE:	J. Vennes January 2012

Course Information	**ME 236 Engineering Mechanics I** 3 credits Required Spring 2012
INSTRUCTOR:	Dr. Ma'en Sari Office: JH513 Phone: 646-2630 email: maen@nmsu.edu
ASSISTANTS:	Diego Bezerra email: dbezerra@nmsu.edu
OFFICE HOURS:	1:00 p.m.- 3:00 p.m. TR 11:00 a.m.- 12:00 p.m. F or by appointment
CATALOG DESCRIPTION:	Force systems, resultants, equilibrium, distributed forces, area moments, friction, and kinematics of particles.
PREREQUISITES:	Math 192
PRE/COREQUISITES:	Phys 215
TEXT:	*Engineering Mechanics: Statics and Dynamics, 12th Ed., Russell C. Hibbeler, Pearson Education, ISBN-10: 0138149291, ISBN-13: 9780138149291.*
CLASS SCHEDULE:	Lecture: 8:30 a.m. - 9:20 a.m. - MWF - JH 204 Section M01 Lecture: 9:30 a.m. - 10:20 a.m. - MWF - JH 204 Section M02
GRADES:	Homework: 20% Exam 1 25% Exam 2 25% Final Exam 30%
COURSE OBJECTIVES:	<u>After completing this course, a student should be able to:</u> • Determine resultants of concurrent force systems using vector method (a). • Apply equilibrium conditions to force systems (a). • Construct free body diagrams of particles, rigid bodies, and structures, and identify all external forces and moments acting on them (k). • Use principles of equilibrium to determine forces and moments acting on individual members of trusses, and other structures (k). • Apply concepts of friction to a variety of problems including ramps, sliding vs. tipping, wedges, and belts (e). • Determine the centroid and moment of inertia of cross-sectional areas, including structural shapes (a).

Course Information	**ME 236 Engineering Mechanics I** 3 credits Required Spring 2012
TOPICS COVERED:	Statics and Particle Dynamics • Vectors • Particle equilibrium • Equivalent force systems • Rigid body equilibrium • Area and mass moments of inertia • Friction • Kinematics of particles
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	A mastery of the fundamentals of mechanical engineering B ability to formulate, analyze, and creatively participate in the solution of multidisciplinary problems through use of modern engineering
RELATIONSHIP TO PROGRAM OUTCOMES:	a ability to apply knowledge of mathematics, science, and engineering e ability to identify, formulate, and solve engineering problems k ability to use the techniques, skills and modern tools necessary for engineering practice
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME2 ability to apply advanced mathematics, multivariate calculus, and differential equations
POLICIES:	• Homework assignments are due at the BEGINNING of class the day they are due. • No late homework will be accepted unless prior arrangements have been made with the instructor. • No make-up allowed on homework except by prior arrangement. **Class participation and behavior** • Classroom participation is a part of learning; it is only by asking questions and talking through ideas that you can come to fully understand the material. In calculating your final grade, I will take into consideration the contribution you have made to the discussion in class. • Please do not engage in behavior which detracts from the ability of other students to learn. Such behaviors include arriving at class late, speaking or whispering while the instructor and students are discussing ideas or asking questions, reading newspapers in class, cell-phones ringing, etc.
AUTHOR/DATE:	M. Sari January 2012

Course Information	**ME 237 Engineering Mechanics II** 3 credits Required Spring 2012
INSTRUCTOR:	Dr. J. Genin Office: JH110 Phone: 646-3809 email: jgenin@nmsu.edu
ASSISTANTS:	NA
OFFICE HOURS:	1:30 p.m.- 2:30 p.m. MTWRF or by appointment
CATALOG DESCRIPTION:	Kinetics of particles, kinematics and kinetics rigid bodies, systems of particles, energy and momentum principles, and kinetics of rigid bodies in three dimensions.
PREREQUISITES:	ME 236
PRE/COREQUISITES:	Math 291
TEXT:	*Engineering Mechanics: Statics and Dynamics, 12th Ed., Russell C. Hibbeler, Pearson Education, ISBN-10: 0138149291, ISBN-13: 9780138149291.*
CLASS SCHEDULE:	Lecture: 10:30 a.m. - 11:20 a.m. - MWF - JH 209 M01 Lecture: 12:30 p.m. - 1:20 p.m. - MWF - JH 103 M02
GRADES:	Homework: 15% Test1: 15% Test2: 20% Test3: 25% Final Exam: 25%
COURSE OBJECTIVES:	<u>After completing this course, a student should be able to:</u> • Understanding of Static and Dynamic Equilibrium • Proficiency in developing Mathematical Models (FBD's) • Understanding of the Kinematics and Kinetics of Particles • Understanding of Energy and Momentum Principles wrt Particles • Understanding of the Kinematics and Kinetics for Planar Motion of Rigid Bodies • Understanding of Energy and Momentum Principles for Planar Motion of Rigid Bodies • Understanding of the Kinematics and Kinetics for Three Dimensional Motion of Rigid Bodies • The ability to use knowledge acquired in above to formulate, solve and interpret solutions

Course Information	**ME 236 Engineering Mechanics I** 3 credits Required Spring 2012
	of engineering problems.(e)
TOPICS COVERED:	• Vector Algebra and Static Equilibrium • Kinematics and Kinetics, Energy and Momentum principles for Particles Rigid Bodies in Planar Motion Rigid Bodies in Three Dimensional Motion • Moments and Products of Inertia • Relative Motion and Moving Reference Frame
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	B ability to formulate, analyze, and creatively participate in the solution of multidisciplinary problems through use of modern engineering
RELATIONSHIP TO PROGRAM OUTCOMES:	e ability to identify, formulate, and solve engineering problems
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME2 ability to apply advanced mathematics, multivariate calculus, and differential equations
POLICIES:	• Homework assignments must include: 1. problem description, 2. mathematical model(s), 3. formulation of solution, 4. presentation of mathematical procedures used, 5. results, and where appropriate, 6. analysis of results. • Late homework assignments will not be accepted. • Collaboration in the form of discussion of formulation of solutions or results is encouraged, however, each individual must work independently to create the required solutions to homework assignments. • Grades will be assigned on an absolute scale
AUTHOR/DATE:	J. Genin January 2012

Course Information	**ME 240 Thermodynamics** 3 credits Required Spring 2012
INSTRUCTOR:	Dr. Ian H Leslie Office: JH112 Phone: 646-2335 email: ileslie@nmsu.edu
ASSISTANTS:	Moises Gonzalez Reyes email: grmoises@nmsu.edu
OFFICE HOURS:	4:30 p.m.- 5:30 p.m. TR or by appointment
CATALOG DESCRIPTION:	First and second laws of thermodynamics, irreversibility and availability, applications to pure substances and ideal gases.
PREREQUISITES:	Phys 215G
TEXT:	*Çengel, Y. A. and Boles, M. A., Thermodynamics: An Engineering Approach, 7th ed., the McGraw-Hill Companies, Inc., New York, © 2008* This is a Blackboard course – http://learn.nmsu.edu to go to Blackboard page or the Blackboard link on MyNMSU page - https://my.nmsu.edu
CLASS SCHEDULE:	Lecture: 8:30 a.m. - 9:20 a.m. - MWF - JH 209 M01 Lecture: 10:30 a.m. – 11:20 a.m. - MWF - JH 209 M02
GRADES:	Homework & Quizzes 15% 3 class exams & Final Exam 85%
COURSE OBJECTIVES:	• The student will be able to determine properties of real substances, such as steam and refrigerant 134-a, and ideal gases from either tabular data or equations of state.(a) • The student will be able to analyze processes involving ideal gases and real substances as working fluids in both closed systems and open systems (systems and control volumes) to determine process diagrams, apply the first law of thermodynamics to perform energy balances, and determine heat and work transfers.(e) • The student will be able to analyze closed and open systems through the application of the second law. (e) • The student will be able to analyze the Otto and Rankine cycles.(e)
TOPICS COVERED:	• Basic Thermodynamic concepts • Introduction to energy and the First Law • Properties of pure substances • First Law for closed systems • First Law for open systems • The Second Law

Course Information	**ME 240 Thermodynamics** 3 credits Required Spring 2012
	• Entropy and First and Second Law applications • Introduction to power cycles • Reviews and Exams
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	B ability to formulate, analyze, and creatively participate in the solution of multidisciplinary problems through use of modern engineering
RELATIONSHIP TO PROGRAM OUTCOMES:	e ability to identify, formulate, and solve engineering problems
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME2 ability to apply advanced mathematics, multivariate calculus, and differential equations ME4 ability to work professionally in both thermal and mechanical systems areas
POLICIES:	• None
AUTHOR/DATE:	I. Leslie January 2012

Course Information	**ME 261 Mechanical Engineering Problem Solving** 4 credits Required Spring 2012
INSTRUCTOR:	Dr. Gabe Garcia Office: JH206A Phone: 646-7749 email: gabegarc@nmsu.edu
ASSISTANTS:	Jose Garcia Office: JH606 Phone: 646-2713 email: ramgar01@nmsu.edu
OFFICE HOURS:	9:30 a.m.- 12:00 p.m. MWF 3:00 p.m.-5:00 p.m. T or by appointment
CATALOG DESCRIPTION:	Introduction to programming syntax, logic, and structure. Numerical techniques for root finding, solution of linear and nonlinear systems of equations, integration, differentiation, and solution of ordinary differential equations will be covered. Multi function computer algorithms will be developed to solve engineering problems.
PREREQUISITES:	Math 192
TEXT:	*Applied Numerical Methods with MATLAB, 3rd Ed., Steven Chapra, McGraw-Hill, 2010*
CLASS SCHEDULE:	Lecture: TR 08:55 a.m. - 10:10 a.m. EC 110 Sections M01 & M70 Lab: R 2:35 p.m. - 5:25 p.m. JH 604 Section M01 Lab: R 5:30 p.m. - 8:20 p.m. JH 604 Section M70
GRADES:	Homework: 10% Lab Work: 10% Exam1: 20% Exam2: 20% Exam3: 20% Exam4: 20%
COURSE OBJECTIVES:	• Students will learn a variety of numerical methods that are useful in both basic and advanced engineering calculations. (a) • Students will learn how to formulate algorithms and write programs to solve engineering problems. (e) • Students will develop an appreciation for the hazards and limitations of numerical solutions, including accuracy, stability, and computer limitations of memory and speed. (k)

Course Information	**ME 261 Mechanical Engineering Problem Solving** 4 credits Required Spring 2012
TOPICS COVERED:	• MATLAB Program Environment • MATLAB Functions • Roots of Equations • Linear systems of equations • Non Linear systems of equations • Interpolation and Curve fitting • Numerical differentiation and integration • Solution of Ordinary differential equations
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	A mastery of the fundamentals of mechanical engineering
RELATIONSHIP TO PROGRAM OUTCOMES:	a ability to apply knowledge of mathematics, science, and engineering e ability to identify, formulate, and solve engineering problems k ability to use the techniques, skills and modern tools necessary for engineering practice
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC2 1 year math and basic science PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME2 ability to apply advanced mathematics, multivariate calculus, and differential equations ME3 familiarity with statistics and linear algebra
POLICIES:	• All computer programs must be written in MATLAB as instructed and well commented. • All Homework must be uploaded into the appropriate folder on the M drive by 11:30 p.m. the day it is due. • Late homework or homework not in the correct folder will be assigned a zero grade. • All labs and exams must be uploaded into the appropriate folder on the M drive by the end of class on the day of the lab or exam. • Collaboration in the form of discussion of formulation of solutions or results is encouraged; however, each individual must work independently to create the solution and computer programs. • Attendance will be checked each class period. Students who miss three consecutive class periods or continually miss class periods will be dropped from the course.
AUTHOR/DATE:	G. Garcia January 2012

Course Information	**ME 326 Mechanical Design** 3 credits Required Spring 2012
INSTRUCTOR:	Dr. Edgar Conley Office: JH519 Phone: 646-5698 email: econley@nmsu.edu
ASSISTANTS:	TBA
OFFICE HOURS:	2:30 p.m.- 3:30 p.m. TR or by appointment
CATALOG DESCRIPTION:	Design methodology and practice for mechanical engineers.
PREREQUISITES:	ME 237 and CE 301
TEXT:	*Fundamentals of Machine Component Design, 4th Ed., Juvinal and Marshek, Wiley, 2006*
CLASS SCHEDULE:	Lecture: 11:30 a.m. - 12:20 p.m. - MW - JH 203 Lab: 12:30 p.m. - 1:20 p.m. - MWF - JH 203
GRADES:	Class participation: 5% Homework: 50% Design Project: 20% Final Exam: 25%
COURSE OBJECTIVES:	• Conduct experiments and analyze data (b) • Major design experience (c) • Team working (d) • Professional and ethical responsibilities (f) • Knowledge of contemporary issues (j)
TOPICS COVERED:	• Design Methods • Case studies • Professional practice • Safety
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	B ability to formulate, analyze, and creatively participate in the solution of multidisciplinary problems through use of modern engineering D skills needed to fulfill professional duties and responsibilities in teamwork, collegiality, ethics, technical leadership, etc.

Course Information	**ME 326 Mechanical Design** 3 credits Required Spring 2012
RELATIONSHIP TO PROGRAM OUTCOMES:	c ability to design a system, component or process to meet desired needs within realistic constraints d ability to function on multidisciplinary teams f understanding of professional and ethical responsibility j knowledge of contemporary issues
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC1 major design experience PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME2 ability to apply advanced mathematics, multivariate calculus, and differential equations ME4 ability to work professionally in both thermal and mechanical systems areas
POLICIES:	• No makeup exam • Late homework will not be accepted. • Grades will be normalized. Then, 90=a, 80=b, 70=c, etc.
AUTHOR/DATE:	E. Conley January 2012

Course Information	**ME 328 Engineering Analysis I** 3 credits Required Spring 2012
INSTRUCTOR:	Nathanael Greene Office: JH 628 Phone: 646-3322 email: ngreene@nmsu.edu
ASSISTANTS:	NA
OFFICE HOURS:	6:00 p.m.- 7:00 p.m. M or by appointment
CATALOG DESCRIPTION:	Mathematical methods for exact and approximate solutions of engineering problems.
PREREQUISITES:	Math 392
TEXT:	*Advanced Engineering Mathematics, 2nd Ed., Michael D. Greenberg, Prentice-Hall, 1998* - (There will also be handouts from time to time.)
CLASS SCHEDULE:	Lecture: 7:30 a.m. - 8:45 a.m. - TR - JH 203
GRADES:	Exam 1: 25% Exam 2: 25% Portfolio: 25% Homework: 25%
COURSE OBJECTIVES:	• To learn how to construct differential equation models of phenomena relevant to Mechanical & Aerospace engineering. (a) • To learn basic methods for solution of these ordinary and partial differential equations. • To apply the solutions to simple analysis and design situations. (e)
TOPICS COVERED:	• Ordinary Differential Equations • Laplace Transforms • Linear Algebra • Fourier Series and Fourier Transforms • Partial Differential Equations
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	A mastery of the fundamentals of mechanical engineering
RELATIONSHIP TO PROGRAM OUTCOMES:	a ability to apply knowledge of mathematics, science, and engineering

Course Information	**ME 328 Engineering Analysis I** 3 credits Required Spring 2012
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC2 1 year math and basic science
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME2 ability to apply advanced mathematics, multivariate calculus, and differential equations ME3 familiarity with statistics and linear algebra
POLICIES:	• Grading will be on a curve; grades will be determined based on comparison of each student's total with the overall class average. • Collaboration with other students in attacking homework problems is permitted, but the assignments turned in should be the student's own work. • One day late homework will lose 25% value and later homework will not be accepted.
AUTHOR/DATE:	N. Greene January 2012

Course Information	**ME 329 Engineering Analysis II** 3 credits Required Spring 2011
INSTRUCTOR:	Dr. Ian Leslie Office: JH112 Phone: 646-2335 email: ileslie@nmsu.edu
ASSISTANTS:	NA
OFFICE HOURS:	9:30 a.m.- 12:00 p.m. MWF or by appointment
CATALOG DESCRIPTION:	Numerical methods for roots of linear and nonlinear equations, numerical integration, and solution of ordinary differential equations with emphasis on software design and engineering applications.
PREREQUISITES:	Math 392, ME 260
TEXT:	*No text*
CLASS SCHEDULE:	Lecture: 1:10 p.m. - 2:15 p.m. - TR - JH 103
GRADES:	Homework 70% Quizzes 30%
COURSE OBJECTIVES:	• Students will learn a variety of numerical methods that are useful in both basic and advanced engineering calculations. (a, e) • Students will develop an appreciation for the hazards and limitations of numerical solutions, including accuracy, stability, and computer limitations of memory and speed. (e, k) • Students will learn the basics of Matlab. (k)
TOPICS COVERED:	• Roots of Equations • Linear systems of equations • Non Linear systems of equations • Interpolation and Curve fitting • Numerical differentiation and integration • Solution of ordinary differential equations • Solution of partial differential equations
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	A mastery of the fundamentals of mechanical engineering
RELATIONSHIP TO PROGRAM OUTCOMES:	a ability to apply knowledge of mathematics, science, and engineering k ability to use the techniques, skills and modern tools necessary for engineering practice

Course Information	**ME 329 Engineering Analysis II** 3 credits Required Spring 2011
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC2 1 year math and basic science
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME2 ability to apply advanced mathematics, multivariate calculus, and differential equations ME3 familiarity with statistics and linear algebra
POLICIES:	• Homework assignments must be turned in on time for full credit. • Collaboration in the form of discussion of formulation of solutions or results is encouraged for homework; however, each individual must work independently to create the final homework solution. • Collaboration in any form is not allowed for the quizzes. • Grades may be curved but the instructor makes no commitment to do so.
AUTHOR/DATE:	I. Leslie January 2011

Course Information	**ME 331 Intermediate Strength of Materials** 3 credits Spring 2012
INSTRUCTOR:	Dr. Vincent Choo Office: JH516 Phone: 646-2225 email: vchoo@nmsu.edu
ASSISTANTS:	NA
OFFICE HOURS:	via email
CATALOG DESCRIPTION:	Covers stress and strain, theories of failure, curved flexural members, flat plates, pressure vessels, buckling, and composites.
PREREQUISITES:	Math 392, CE 301
TEXT:	*Advanced Strength and Applied Stress Analysis, 2nd Ed., Richard G. Budynas, McGraw-Hill, 1999*
CLASS SCHEDULE:	Lecture: 11:30 a.m. - 12:20 a.m. - MWF - JH 204
GRADES:	Homework: 20% Quizzes: 20% Mid-term Exam: 30% Final Exam: 30%
COURSE OBJECTIVES:	• This course is designed to develop the student's ability to solve strength of materials problems.
TOPICS COVERED:	• Stress • Equilibrium Equation • Stress Transformation • Strain • Compatibility Condition • Strain Transformation • Constitutive relation • Plane Elastic Problems • The Airy Stress Function • Bending of thin flat plates • Thick-wall pressure vessels • Virtual Load Method - Statically Indeterminate Problems • Rayleigh Method • Rayleigh – Ritz Method • Photoelasticity • Matrices

Course Information	**ME 331 Intermediate Strength of Materials** 3 credits Spring 2012
POLICIES:	• Attend all lectures
AUTHOR/DATE:	V. Choo January 2012

Course Information	**ME 333 Intermediate Dynamics** 3 credits Spring 2012
INSTRUCTOR:	Dr. Joe Genin Office: JH 110 Phone: 646-3809 email: jgenin@nmsu.edu
ASSISTANTS:	NA
OFFICE HOURS:	MWF 1-2pm, or by appointment
CATALOG DESCRIPTION:	Three dimensional kinematics and kinetics, orbital motion, Lagrange's equations, dynamic stability, and controls.
PREREQUISITES:	ME 237 or consent of instructor
TEXT:	*Website – http://me.nmsu.eud/~jgeninn*
CLASS SCHEDULE:	Lecture: 11:30 a.m. - 12:20 a.m. - MWF - JH 204
GRADES:	Homework: 40% # Tests: 60%
COURSE OBJECTIVES:	• Understanding of Kinematics of Rigid Bodies • Understanding of Dynamic Equilibrium of Rigid Bodies • Proficiency in developing Mathematical Models using a) free body diagrams, b) Lagrange's equations (c) • Ability to use knowledge acquired above to formulate and solve problems in intermediate dynamics
TOPICS COVERED:	• Kinematics and Kinetics of Particles and Planar Rigid Bodies using moving reference frames, featuring Cartesian Coordinates, Path Variables, Cylindrical Coordinates • Kinematics of three dimensional bodies • Kinetic descriptions considering: Equations of Motion, Work-Energy, • Linear Impulse-Momentum, Angular Impulse-Momentum • Mass Moments and Products of Inertia • Langrange's Equations • Dynamic Stability • Nonholonomic Systems • Vibrations, Single degree of freedom Free, Forced, Damped • Vibrations, Multi-degrees of freedom Free, Forced, Damped
AUTHOR/DATE:	J. Genin

Course Information	**ME 338 Fluid Mechanics** 3 credits Required Spring 2012
INSTRUCTOR:	Dr. B. Shashikanth Office: JH 611 Phone: 646-4348 email: shashi@nmsu.edu
ASSISTANTS:	NA
OFFICE HOURS:	1:30 p.m.- 3:30 p.m. MW or by appointment
CATALOG DESCRIPTION:	Properties of fluids. Fluid statics and fluid dynamics. Applications of the conservation equations continuity, energy, and momentum to fluid systems.
PREREQUISITES:	ME 237
PRE/COREQUISITES:	CE 301 and ME 328
TEXT:	*Fundamentals of Fluid Dynamics, B.R. Munson, D.F. Young and T.H. Okiishi, Wiley, 6th edition (Student Value Edition), 2009*
CLASS SCHEDULE:	Lecture: 11:30 a.m. - 12:20 p.m. - TR - JH 205
GRADES:	Homework: 15% Four exams: 45% Class participation: 5% Final: 35%
COURSE OBJECTIVES:	Develop a basic proficiency in: • Ability to analyze hydrostatic loading problems (a,e). • Applications of mass, momentum and energy conservation laws to fluid mechanics problems (a,e). • Applications of dimensional analysis and dynamic similitude (b,e). • Development of understanding of empirical formulations for internal and external flows (c,e).
TOPICS COVERED:	• Fluid Statics • Bernoulli's Equation & Fluid Dynamics • Integral Approach and Control Volumes • Dimensional Analysis • Internal Flow – Pipe Flows
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	A mastery of the fundamentals of mechanical engineering B ability to formulate, analyze, and creatively participate in the solution of multidisciplinary problems through use of modern engineering
RELATIONSHIP TO PROGRAM OUTCOMES:	a ability to apply knowledge of mathematics, science, and engineering b ability to design and conduct experiments, as well as to analyze and interpret data c ability to design a system, component or process to meet desired needs within realistic constraints e ability to identify, formulate, and solve engineering problems
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC2 1 year math and basic science PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME2 ability to apply advanced mathematics, multivariate calculus, and differential equations

Course Information	**ME 338 Fluid Mechanics** 3 credits Required Spring 2012
	ME4 ability to work professionally in both thermal and mechanical systems areas
POLICIES:	• Final grades will be determined using the following grading scale: A=>85, B=75-84, C=65-74, D=50-65, F=<50. Graded material will include homework, four exams and a comprehensive final. Absence from graded classroom activities will result in a grade of zero on that exam, unless student informs instructor before the exam and produces a valid document of absence.
AUTHOR/DATE:	B. Shashikanth January 2012

Course Information	**ME 341 Heat Transfer** 3 credits Required Spring 2012
INSTRUCTOR:	Dr. Ma'en Sari Office: JH513 Phone: 646-2630 email: maen@nmsu.edu
ASSISTANTS:	NA
OFFICE HOURS:	1:00 p.m.- 3:00 p.m. TR 11:00 a.m.- 12:00 p.m. F or by appointment
CATALOG DESCRIPTION:	Fundamentals of conduction, convection, and radiation. Design of heat transfer systems.
PREREQUISITES:	ME 240, ME 328
TEXT:	*Principles of Heat Transfer, Kreith, Manglik, Bohn, 7th Edition, Cengage Learning, ISBN: 9780495667704*
CLASS SCHEDULE:	Lecture: 1:30 p.m. - 2:20 a.m. - MWF - JH 205
GRADES:	Homework and Quizzes 20% Exam 1 25% Exam 2 25% Final Exam 30%
COURSE OBJECTIVES:	• Students will learn to formulate and solve typical analytical problems that arise in Mechanical Engineering • Students will become familiar with special mathematical functions that arise in the solution of Mechanical Engineering problems
TOPICS COVERED:	• Steady-State Conduction • Transient Conduction • Internal Convection • External Convection • Free Convection • Boiling and Condensation • Heat Exchangers • Radiation Properties and Processes • Radiation Exchange Between Surfaces • Applications and Design

Course Information	**ME 341 Heat Transfer** 3 credits Required Spring 2012
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	A mastery of the fundamentals of mechanical engineering
RELATIONSHIP TO PROGRAM OUTCOMES:	a ability to apply knowledge of mathematics, science, and engineering e ability to identify, formulate, and solve engineering problems
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME2 ability to apply advanced mathematics, multivariate calculus, and differential equations ME4 ability to work professionally in both thermal and mechanical systems areas
POLICIES:	• During lecture, please turn off all cell phone ringers and pager buzzers so that these devices do not disturb the class (or the professor). **Class participation and behavior** • Classroom participation is a part of learning; it is only by asking questions and talking through ideas that you can come to fully understand the material. In calculating your final grade, I will take into consideration the contribution you have made to the discussion in class. • Please do not engage in behavior which detracts from the ability of other students to learn. Such behaviors include arriving at class late, speaking or whispering while the instructor and students are discussing ideas or asking questions, reading newspapers in class, cell-phones ringing, etc.
AUTHOR/DATE:	M. Sari January 2012

Course Information	**ME 425 Design of Machine Elements** 3 credits Required Spring 2012
INSTRUCTOR:	Dr. Edgar Conley Office: JH519 Phone: 646-5698 email: econley@nmsu.edu
ASSISTANTS:	NA
OFFICE HOURS:	2:30 p.m.- 3:30 p.m. MWF or by appointment
CATALOG DESCRIPTION:	Design of machine elements through the application of mechanics. Fatigue and theories of failure. Design projects assigned.
PREREQUISITES:	ME 326
TEXT:	*Fundamentals of Machine Component Design, 4th Ed., R.C. Juvinall and K.M. Marshek, Wiley, 2009*
CLASS SCHEDULE:	Lecture: 11:45 a.m. - 1:00 p.m. - TR - JH 205
GRADES:	Homework: 25% Quizzes: 25% Project: 25% Final Exam: 25%
COURSE OBJECTIVES:	• Perform load analyses on machine element parts and assemblies. (a) • Perform stress and strain analyses on machine elements and determine element deflections. (a,e,k) • Utilize standard failure theories and fatigue analysis to develop safety factors and reliability for machine elements. (f,i,k) • Select materials for particular machine elements and machine element assemblies. (e,i) • Design machine elements and machine element assemblies. (c,k) • Work effectively as part of a design team. (c,g)
TOPICS COVERED:	• Load analysis • Materials • Stresses • Deflections • Failure theories and fatigue analysis • Bearings, gears, and shafts • Project
RELATIONSHIP TO PROGRAM	A mastery of the fundamentals of mechanical engineering

Course Information	**ME 425 Design of Machine Elements** 3 credits Required Spring 2012
EDUCATIONAL OBJECTIVES:	B ability to formulate, analyze, and creatively participate in the solution of multidisciplinary problems through use of modern engineering
RELATIONSHIP TO PROGRAM OUTCOMES:	a ability to apply knowledge of mathematics, science, and engineering c ability to design a system, component or process to meet desired needs within realistic constraints e ability to identify, formulate, and solve engineering problems k ability to use the techniques, skills and modern tools necessary for engineering practice
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME4 ability to work professionally in both thermal and mechanical systems areas
POLICIES:	• All homework is due the period following its assignment. • Homework must be submitted on time unless prior arrangements have been made with the instructor.
AUTHOR/DATE:	E. Conley January 2012

Course Information	**ME 426/427 Design Project Laboratory I & II** 6 credits Required Spring 2012
INSTRUCTOR:	Dr. Young H. Park Office: JH 615 Phone: 646-3092 email: ypark@nmsu.edu
ASSISTANTS:	TBD
OFFICE HOURS:	8:00 a.m.- 9:00 a.m. MTWRF or by appointment
CATALOG DESCRIPTION:	Students address a design problem in which innovation and attention to detail are emphasized. Solution of the problem entails applications of mechanics and/or the thermal sciences. --- ME 426 Continuation of M E 426 --- ME 427
PREREQUISITES:	ME 326 and (ME 338 or AE 339) --- ME 426 ME 426 --- ME 427
PRE/COREQUISITES:	ME 425 and ME 341 --- ME 426
TEXT:	*None*
CLASS SCHEDULE:	Lecture: 3:30 p.m. - 6:20 p.m. - M - HA 104 3:30 p.m. - 6:20 p.m. - W - JH 283
GRADES:	Class Participation: 20% Individual & team performance: 30% Group Deliverable: 50%
COURSE OBJECTIVES:	• Have experience functioning as mechanical engineer within an engineering design and development group. (d) • Complete a real-life design task – transform a client's needs into a tangible, tractable project definition, and see the project through to completion. (c) • Understand and use a formal engineering design method, with emphasis on building concurrent engineering procedures into the basic design method. (c) • Become proficient in collaboratively preparing and reviewing formal technical design package related to an engineering design including final design binder and report (g)
TOPICS COVERED:	• Participation in a project team • Use of technical tools from past engineering courses • Strengthening of teaming skills • Learning how to apply engineering fundamentals to the design

Course Information	**ME 426/427 Design Project Laboratory I & II** 6 credits Required Spring 2012
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	B ability to formulate, analyze, and creatively participate in the solution of multidisciplinary problems through use of modern engineering C ability to communicate clearly and effectively with fellow engineers, employers and general public D skills needed to fulfill professional duties and responsibilities in teamwork, collegiality, ethics, technical leadership, etc.
RELATIONSHIP TO PROGRAM OUTCOMES:	c ability to design a system, component or process to meet desired needs within realistic constraints d ability to function on multidisciplinary teams g ability to communicate effectively
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC1 major design experience PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME4 ability to work professionally in both thermal and mechanical systems areas
POLICIES:	• None
AUTHOR/DATE:	Y. Park January 2012

Course Information	**ME 449 Mechanical Engineering Senior Seminar** 1 credits Required Spring 2012
INSTRUCTOR:	Dr. Edgar Conley Office: JH519 Phone: 646-5698 email: econley@nmsu.edu
ASSISTANTS:	NA
OFFICE HOURS:	2:30 p.m.- 3:30 p.m. TR or by appointment
CATALOG DESCRIPTION:	Senior seminar course covering topics relevant to graduating mechanical engineering seniors (job placement, interviewing techniques, resume preparation).
PREREQUISITES:	senior standing
TEXT:	*None; handouts will be provided as needed*
CLASS SCHEDULE:	Lecture: 11:30 a.m. - 12:20 p.m. - F - JH 203
GRADES:	Attendance: 50% Writing assignments: 50%
COURSE OBJECTIVES:	• to prepare students for productive and fulfilling careers in industry and/or graduate school • to provide guidance and instruction in ethics and professionalism (f) • to expose students to successful practicing engineers and others who can offer advice and counseling (k, i) • to improve written communication skills (g) • to promote lifelong learning and breadth in perspective (i)
TOPICS COVERED:	• Career paths • Reading and lifelong learning • Graduate school as a career option • Engineering ethics • Business comportment, etiquette, manners • Engineers and the environment • Professional registration and licensing
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	C ability to communicate clearly and effectively with fellow engineers, employers and general public D skills needed to fulfill professional duties and responsibilities in teamwork, collegiality, ethics, technical leadership, etc.

Course Information	**ME 449 Mechanical Engineering Senior Seminar** 1 credits Required Spring 2012
RELATIONSHIP TO PROGRAM OUTCOMES:	f understanding of professional and ethical responsibility g ability to communicate effectively i recognition of the need for, and an ability to engage in lifelong learning j knowledge of contemporary issues
CONTRIBUTION TO PROFESSIONAL COMPONENT:	NA
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	NA
POLICIES:	• attendance will be monitored
AUTHOR/DATE:	E. Conley January 2012

Course Information	**ME 445 Experimental Methods II** 3 credits Required Spring 2012
INSTRUCTOR:	Dr. A. Donaldson Office: JH612 Phone: 646-6545 email: bdonalds@nmsu.edu
ASSISTANTS:	Ahmed Showman, Mohammad Omari, Mehdi Tabandeh
OFFICE HOURS:	After lecture or by appointment
CATALOG DESCRIPTION:	Emphasis on experimental techniques, instrumentation and data acquisition in fluid mechanics, heat transfer, and thermodynamics. Laboratory results will be presented in written and verbal formats.
PREREQUISITES:	(ME 338 or AE 339), ME 340, ME 341, and ME 345
TEXT:	*Experimental Methods for Engineers 7th, Holman, J. P., McGraw-Hill, Inc., 2001* (optional). In addition, textbooks utilized in the theory courses for thermodynamics, fluid mechanics and heat transfer (corresponding to prerequisites listed above) will be utilized as references. ME 445 Course Notes as available from MAE M-drive.
CLASS SCHEDULE:	Lecture: 1:30 p.m. - 2:20 p.m. - WF - JH 103 Lab: See Course Schedule - TBA
GRADES:	Formal reports and prelabs: 50% Final report, including proposal and oral presentation: 30% Scheduled quizzes (3) and unscheduled classroom exercises: 20%
COURSE OBJECTIVES:	• Physical demonstration of phenomenologies in fluid mechanics, heat transfer and thermodynamics • Provide students with opportunities to predict outcomes of experiments based on theoretical models and verify predictions by measurement • Utilize various measurement and data acquisition tools • Analyze data and present results • Participate as a team member of a functional group • Practice communication skills in both written and oral format
TOPICS COVERED:	• Pressure drop for liquid flow in straight pipe and fittings, comparison of flow meters, calibration of transducers, uncertainty analysis of orifice measurement. • Operation of a diesel engine on diesel fuels and vegetable oils and compare performance and emissions. • Pressure vessel blowdown modeling and measurement, writing applications for LabVIEW® based computer data acquisition.

Course Information	**ME 445 Experimental Methods II** 3 credits Required Spring 2012
	• Thermoelectric effect, including thermocouples, response time analysis, thermopiles. • Heat exchanger analysis and measurements for 3 types of heat exchangers. • Group directed experiment that will be proposed, planned and executed by group. Should include clear objectives, a theoretical model, data acquisition consistent with equipment which is available, and comparison to literature results. Concurrence of course instructor and TA on topic, methods and scope is required.
RELATIONSHIP TO PROGRAM EDUCATIONAL OBJECTIVES:	A mastery of the fundamentals of mechanical engineering B ability to formulate, analyze, and creatively participate in the solution of multidisciplinary problems through use of modern engineering C ability to communicate clearly and effectively with fellow engineers, employers and general public
RELATIONSHIP TO PROGRAM OUTCOMES:	b ability to design and conduct experiments, as well as to analyze and interpret data e ability to identify, formulate, and solve engineering problems g ability to communicate effectively
CONTRIBUTION TO PROFESSIONAL COMPONENT:	PC3 1 1/2 years engineering topics (engineering science and design)
RELATIONSHIP TO ABET SPECIFIC CRITERIA:	ME2 ability to apply advanced mathematics, multivariate calculus, and differential equations ME3 familiarity with statistics and linear algebra ME4 ability to work professionally in both thermal and mechanical systems areas
POLICIES:	• Five of the experiments will be conducted on a two week cycle. The first week will be spent in analyzing the assigned problem and predicting outcome or collecting information which will be used later. When appropriate, the prediction will be submitted to the TA at the end of that session as a prelab, to document predictions over range of variables. Prelabs will also contain other requested information that will ultimately be included in the formal report. The second week will be devoted to experimentation and data collection. An electronic report will then be written and submitted at the start of the subsequent lab meeting. Late reports will carry a penalty of two points for each day late, unless a due date holiday is declared by course instructor. The report will discuss the theory and compare predictions to measurements and comment on quality of the comparison. The final topic will be a group selected experiment to make measurements to verify a hypothesis or determine a physical outcome, related to fluid mechanics, heat transfer or thermodynamics. The group will be responsible for writing a proposal including the objective(s), the theory that is to be utilized, the equipment required, the scope of the measurements, and the methodology. Once this proposal has been reviewed and approved by the course instructor and TA, the team will set about to assemble or fabricate the apparatus, make the measurement(s) and compare results to predictions or literature sources. This final report will be in both oral and written format.

Course Information	**ME 445 Experimental Methods II** 3 credits Required Spring 2012
	• This course seeks to prepare engineers for collaborative interaction with colleagues on a professional level. To that end, teams will be formed based on individual selection and each member is expected to participate in group activities related to pre-laboratory exercises, conduct of experiments and the reporting of results. After each report is submitted, the team can, by majority vote, elect to disband and reform in an altered configuration. Individuals who have been ejected from the group will prepare individual pre-lab predictions and subsequent reports, based on commonly collected and shared data. It is strongly advised that each individual in every group adequately contribute to the report preparation effort in order to avoid expulsion from the group. It is also advised that for each experiment, a group leader should be selected who will assign individual responsibilities and see to the final compilation and consistent format of the report and to its submission in a timely manner. • Reports will be ranked from high to low. Rather than a letter or numerical grade, a rank designator will be used, based on two components: technical presentation and grammatical presentation where each component carries comparable weight. As a general guide for the letter or numerical grade corresponding to the order rank, the highest rank can be tentatively assigned a 95, and the lowest rank can be tentatively assigned a 75. Final grades are anticipated to be curved based on a class average of "B".
AUTHOR/DATE:	A. Donaldson January 2012