Course Codes				Title	Topic	Subletter	Description	Max. Enrollment	May PDF?	May Audit?	Assignments	Website	Final Exam Type	Grading		Sample Reading List		Sections								Meetings					Instructors		
Code	Number	Subletter	Home Dept?											Perc.	Type	Author Name	Title	Format	Number	Status	Max. Enrollment	SCORE Number	Beg. Time	End Time	Place	Days	TBA?	First	Middle	Last
MAE	305		Y	Mathematics in Engineering I			A treatment of the theory of differential equations. The objective is to provide the student with an ability to solve standard problems in this field.	120	N	N			Final			Boyce & DiPrima	Elementary Differential Equations & Boundary Value Problems	L	01	O	120	20079	11:00:00	11:50:00	BOWEN 222	M W F	N	Morton	Daniel	Kostin
MAT	301		N																									Zheng		Chen
																												Raghavendra	Pradeep	Kukillaya
																												Zhanhua		Ma
MAE	221		Y	Thermodynamics			Heat and work in physical systems. Concepts of energy conversion and entropy, primarily from a macroscopic viewpoint. Thermodynamic potentials and chemical equilibrium. Applications to engines, heat pumps, and fuel cells. In the laboratory, students will carry out experiments in the fields of analog electronics and thermodynamics. FOR MAE CONCENTRATORS ONLY, a combined laboratory grade will be issued in the spring laboratory course MAE 224, which includes the laboratory work of both MAE 221 and MAE 224.	60	N	N	Weekly reading assignments and problem sets, about 9 hours per week.		Final	20	MidTerm Exam	Moran & Shapiro	Fundamentals of Engineering Thermodynamics, 5th Ed.	B	01	O	12	20059	13:30:00	16:20:00	EQUAJ J209	M	N	Michael		Vocaturo
														40	Final Exam													Syed	Sohail Hamid	Zaidi
														40	Problem Set(s)													Grunde		Jomaas
																		B	02	X	12	20060	13:30:00	16:20:00	EQUAJ J209	T	N	Michael		Vocaturo
																												Syed	Sohail Hamid	Zaidi
																												Grunde		Jomaas
																		B	03	O	12	20061	13:30:00	16:20:00	EQUAJ J209	W	N	Michael		Vocaturo
																												Syed	Sohail Hamid	Zaidi
																												Emanuel	Solomon	Stockman
																		B	04	O	12	20062	13:30:00	16:20:00	EQUAJ J209	Th	N	Michael		Vocaturo
																												Syed	Sohail Hamid	Zaidi
																												Chun-Wei		Pao
																		L	01	O	60	20063	10:00:00	10:50:00	FRIEN 004	M W F	N	Daniel	Mark	Nosenchuck
																		C	01	O	50	20064	12:30:00	13:20:00	EQUAD D221	M	N	Daniel	Mark	Nosenchuck
																												Syed	Sohail Hamid	Zaidi
MAE	223		Y	Modern Solid Mechanics			Fundamental principles of solid mechanics: equilibrium equations, reactions, internal forces, stress, strain, Hooke's law, torsion, beam bending and deflection, and analysis of stress and deformation in simple structures. Integrates aspects of solid mechanics that have applications to mechanical and aerospace structures (engines and wings), as well as to microelectronic and biomedical devices (thin films and artificial hearts). Topics include stress concentration, fracture, plasticity, fatigue, visco-elasticity and thermal expansion. The course synthesizes descriptive observations, mathematical theories, and engineering consequences.	60	Y	Y	Weekly homework assignments, accounts for 30% of the final grade. Weekly quizzes, accounts for 5% of the final grade.		Final	25	MidTerm Exam	E.J. Hearn	Mechanics of Materials, Volumes 1 & 2 (Pergamon)	L	01	O	60	20080	11:00:00	12:20:00	EQUAD D221	T Th	N	Mikko	Petteri	Haataja
CEE	323		N											40	Final Exam	J.P. Den Hartog	Mechanics (Dover)											Yong		Yang
														5	Quizzes															
														30	Problem Set(s)															
MAE	331		Y	Aircraft Flight Dynamics			Introduction to the performance, stability, and control of aircraft. Fundamentals of configuration aerodynamics. Methods for analyzing the dynamics of physical systems. Characterization of modes of motion and desirable flying qualities. Case studies in aircraft stability and control.	60	N	N	Mix of problem sets and short projects.		Final	20	MidTerm Exam	R. Stengel	Flight Dynamics, Princeton University Press, 2004	L	01	O	60	20081	15:00:00	16:20:00	EQUAD D221	T Th	N	Ellen	Meredith	Taylor
														35	Final Exam													Robert	Frank	Stengel
														10	Precept Participation	M.J. Abzug and E.E. Larrabee	Airplane Stability and Control											Milos		Ilak
														35	Problem Set(s)													Sunil	Doulatram	Ahuja
																		P	01	X	60	22359								
MAE	321		Y	Engineering Design			Focus on engineering fundamentals, design processes and procedures. Course covers materials selection and design, machine design and innovation, and design and manufacture for a global environment. Parametric-design and finite-element simulation techniques are introduced in the computer-design laboratory. Instruction in basic and computer-based fabrication and prototyping methods is given in the manufacturing laboratory. Teams of students conduct design projects which involve the complete design cycle from concept and fundamental engineering through optimization, prototype, and test. Description continued in Other Information.	59	N	N	Reading from references and notes. One major project. Lab reports and problem sets. Mid-term exam. The project will involve design concepts, component and system design, construction and device fabrication.		Take-Home	25	MidTerm Exam	Shigley and Mische	Mechanical Engineering Design	B	01	X	15	20065	13:30:00	16:20:00	EQUAC C119	M	N	Glenn	Arther	Northey
														25	Design Project (s)	M.F. Ashby	Materials Selection in Mechanical Design											Guoguang		Fu
														25	Take Home Final Exam			B	02	O	15	20066	13:30:00	16:20:00	EQUAC C119	T	N	Glenn	Arther	Northey
																												Jianbo		Chen
																		B	03	O	15	20067	13:30:00	16:20:00	EQUAC C119	W	N	Glenn	Arther	Northey
																												Jun		Song
																		B	04	O	15	20068	13:30:00	16:20:00	EQUAC C119	Th	N	Glenn	Arther	Northey
																		B	05	O	15	20069	13:30:00	16:20:00	EQUAC C119	F	N	Glenn	Arther	Northey
														10	Lab Reports			L	01	O	59	20070	11:00:00	12:20:00	FRIEN 004	T Th	N	Winston	Oluwole	Soboyejo
														15	Problem Set(s)															
MAE	324		Y	Structure and Properties of Materials			Provides the materials background needed to satisfy the department requirement in this area. Relates properties of metals, alloys, polymers, composite materials, semiconductors, and ceramics to their atomic level and microscopic structure. Relates special materials properties to their exploitation in advanced technology and will illustrate this with specific examples.	55	Y	Y	Weekly problem sets, question cards, and reading in reference texts.		Final	20	MidTerm Exam	Callister	Materials Science & Engineering	L	01	O	55	20082	13:30:00	14:50:00	EQUAD D221	T Th	N	Emily	Ann	Carter
														40	Final Exam			P	01	X	55	20083	12:30:00	13:20:00	EQUAD D221	Th	N	Srevatsan		Muralidharan
														20	Other Exam															
														5	Precept Participation															
														15	Problem Set(s)															
MAE	335		Y	Fluid Dynamics			The first half of the course deals with one-dimensional compressible flows, with special emphasis on jet propulsion applications. The second half of the course deals with aerodynamics of two and three-dimensional wings and bodies, concepts of thrust, lift and drag (frictional and lift-induced). Homework will include design problems and computational examples.	50	Y	Y	Reading 30-40 pages of text. Weekly problem sets.		Final	30	MidTerm Exam	Anderson	Fundamentals of Aerodynamics	L	01	O	50	20071	10:00:00	10:50:00	EQUAD D221	M W F	N	Maria	Pino	Martin
														40	Final Exam	Kuethe & Chow	Foundations of Aerodynamics													
														30	Problem Set(s)	Smits	A Physical Introduction to Fluid Mechanics	P	01	X	50	20084	19:30:00	20:50:00	EQUAD D221	T	N	Bo		Xu
																Liepmann and Roshko	Elements of Gas Dynamics											Zhili		Zhang
MAE	501		Y	Mathematical Methods of Engineering Analysis I			Methods of mathematical analysis for the solution of problems in physics and engineering. Topics include an introduction to functional analysis, linear analysis & eigenvalue problems for matrices & operators, Sturm-Liouville theory, Green's functions for the solution of linear ordinary differential equations and Poisson's equation, and the calculus of variations, and the inverse and implicit function theorems.	50	N	Y			Other			L. Debnath & PR Mikusinski	Introduction to Hilbert Spaces with Applications	L	01	O	50	20311	09:00:00	10:20:00	EQUAA A224	T Th	N	Naomi	Ehrich	Leonard
																RA Horn & CR Johnson	Matrix Analysis													
																M. Greenberg	Foundations of Applied Mathematics													
																IS Sokolniroff & RM Redheffer	Mathematics of Physics & Modern Engineering													
MSE	501		Y	Introduction to Materials			Emphasizes the connection between microstructural features of materials and their properties, and how processing conditions control structure. Topics include atomic bonding, crystal structure, thermodynamics, phase diagrams, defects, microstructure, diffusion, phase transformations, nucleation, coarsening, glasses, elastic and plastic deformation, fracture, processing, composites, and electronic properties.	50	Y	Y			Other			J.F. Nye	Physical Properties of Crystals	L	01	O	50	21439	14:30:00	15:50:00	BOWEN 222	M W	N	George	W.	Scherer
MAE	561		N													P. Haasen	Physical Metallurgy													
																C. Hall	Polymers Materials													
																Y.T. Ciang, D. Birnie, and W.D. Kingery	Physical Ceramics													
																D.A. Porter and K.E. Easterling	Phase Transformations in Metals and Alloys													
																C. Kittel	Introduction to Solid State Physics													
MAE	339		Y	Independent Work			Student selects subject and advisor - defines problem to be studied and proposes work plan. A list of possible subjects of particular interest to faculty and staff members is provided. Written report and oral presentation at end of semester to faculty, staff, fellow students and guests. Independent work is intended for juniors or seniors doing only a one term project. 339 Fall Term project; 340 Spring Term project.	40	N	N			Other	75	Paper In Lieu of Final			C	01	O	20	20072	12:30:00	13:20:00	FRIEN 110	W	N	N.	Jeremy	Kasdin
														20	Oral Presentation(s)			C	02	O	20	20073	19:30:00	20:20:00	FRIEN 110	W	N	N.	Jeremy	Kasdin
														5	Precept Participation															
MAE	339	D	Y	Independent Work with Design		D	Course similar to MAE 339-340. Principal difference is that the project must incorporate aspects and principals of design for a system, product, vehicle, device, apparatus, or other design element. Written report and oral presentation at end of semester to faculty, staff, fellow students and guests. Independent work with design is intended for juniors or seniors doing only a one term project. 339D Fall Term project; 340D Spring Term project.	40	N	N			Other	75	Paper In Lieu of Final			C	01	O	20	20074	12:30:00	13:20:00	FRIEN 110	W	N	N.	Jeremy	Kasdin
														20	Oral Presentation(s)			C	02	O	20	20075	19:30:00	20:20:00	FRIEN 110	W	N	N.	Jeremy	Kasdin
														5	Precept Participation															
MAE	427		Y	Fossil Fuel Energy Conversion: Mobile Power Plants			This course will develop an overview of technology and emission control of modern internal combustion power plants. Fundamental concepts of phenomena associated with mobile power plant design and applications, including both air-breathing and non-airbreathing propulsion will be discussed. Material on spark ignition and diesel power plants, as well as air-breathing propulsion devices, primarily gas turbines, and chemical rockets, will be covered. In addition, combustion emission and emission control will be discussed. Throughout the course, (See other information)	40	N	N	Homework problems, readings, and a sharply focused paper, (10 pages). Check within two weeks of Course Initiation for Recommended Textbook Purchases. Library reserve of all references will be available.		Final	30	MidTerm Exam	Ferguson and Kirkpatrick	Internal Combustion Engines:Applied Thermal Sciences, 2nd Ed	L	01	O	40	20076	11:00:00	11:50:00	EQUAD D221	M W F	N	Frederick	Lewis	Dryer
														35	Final Exam	Hill and Peterson	Mechanics and Thermodynamics of Propulsion													
														5	Precept Participation	Wark, Warner, and Davis	Air Pollution, Its Origin and Control	C	01	O	40	20077	10:00:00	10:50:00	EQUAD D221	Th	N	Frederick	Lewis	Dryer
														30	Problem Set(s)	Sutton	Rocket Propulsion Elements											Timothy	Michael	Ombrello
																Lecture notes are generally distributed throughout	the course													
ELE	521		Y	Linear System Theory			This course covers the fundamentals of linear system theory. Various topics important for further study in dynamic systems, control and communication and signal processing are presented.	36	Y	Y			Final			Brockett	Finite Dimensional Linear Systems	L	01	O	36	20487	15:00:00	16:20:00	FRIEN 108	M W	N	Peter	Jeffrey	Ramadge
MAE	547		N													Delchamps	State Space and Input Output Linear Systems											Jiaping		Liu
																Kailath	Linear Systems													
																Wonham	Linear Multivariable Control: A Geometric Approach													
																Rugh	Linear Systems Theory													
MAE	435		Y	Special Topics in Mechanical and Aerospace Engineering	Entrepreneurial Engineering		This course builds on the technical foundations established in the engineering program, and extends the scope to include the business, financial, and marketing components that lead to successful entrepreneurial ventures. Students will be directly engaged in the process of identifying, creating and exploiting entrepreneurial opportunities. Entrepreneurial design will be introduced and developed. Students, working in small multidisciplinary teams, will identify, design and prototype a highly marketable, consumer product. Classic and modern market analysis, manufacture and distribution will be introduced along with business planning & finance.	30	Y	Y	Reading/Writing Assignments: Reading will be from distributed materials and printed and web-based references. Midterm and final reports (business plans and design reports). Presentations.		Other	50	Design Project (s)	H.H. Stevenson, M.J. Roberts & H. Grousbeck (5th Ed.)	New Business Ventures & the Entrepreneur, 1999 McGraw Hill	L	01	O	30	20078	15:00:00	16:20:00	EQUAD D221	M W	N	Daniel	Mark	Nosenchuck
														25	Oral Presentation(s)	The Indus Entrepreneurs (TiE) (Wiley 2003) - Essentials	of Entrepreneurship: What it Takes to Create Successful...													
														25	Precept Participation	T.R. Hawthorne, NTC Business Books, 1997	The Complete Guide to Infomercial Marketing													
																L.C. Farrell (Wiley 2003) - Getting Entrepreneurial:	Creating & Growing Your Own Business in the 21st Century													
MAE	437		Y	Introduction to Innovation Process Management			In today's hypercompetitive global marketplace, innovation is the lifeblood of any business enterprise. This course exposes students to all fundamental aspects of the technological innovation process: invention/concept development, intellectual property, business plan preparation, competitive intelligence, R&D management, and critical success factors, project management, commercialization. It covers the basic management practices required to excel in the craft of successful innovation and prepares students to become technology-savvy leaders of industry or government, as well as managers and executives in a complex technological society.	30	Y	Y	Specific reading assignments will be given out at the beginning of each lecture. Attendance counts for 20% of the final grade.		Take-Home	40	Take Home Final Exam	W.L. Miller and L. Morris	Fourth Generation R&D	L	01	O	30	22100	11:00:00	12:20:00	FRIEN 108	T Th	N	Karl	H.	Zaininger
EGR	437		N											20	Oral Presentation(s)	M.L. Patterson	Accelerating Innovation													
														20	Precept Participation	E.I. Schwartz	Juice: The Creative Fuel that Drives World-Class Inventors													
														20	Other (See Instructor)	P. Drucker	Management Challenges for the 21st Century													
																J.A. Heim and W.D. Compton	Manufacturing Systems: Foundations of World-Class Practice													
																R.G. Cooper, Winning at New Products:	Accelerating the Process from Idea to Launch, 3rd Ed.													
MAE	541		Y	Applied Dynamical Systems			Phase-plane methods and single-degree-of-freedom nonlinear oscillators; invariant manifolds, local and global analysis, structural stability and bifurcation, center manifolds, and normal forms; averaging and perturbation methods, forced oscillations, homoclinic orbits, and chaos; and Melnikov's method, the Smale horseshoe, symbolic dynamics, and strange attractors.	30	Y	Y			Other			J. Guckenheimer & P. Holmes	Nonlinear Oscillations, Dynamical Systems & Bifurcations of	L	01	O	30	20316	13:30:00	14:50:00	FINEH 110	T Th	N	Clarence	Worth	Rowley
APC	571		N													A.A. Andronov, E.A. Vitt, S.E. Khaiken	Theory of Oscillators													
																M.W. Hirsch, S. SImale adn R.L. Devaney	Dirrential Equations, Dynamical Systems & An Intro to Chaos													
MAE	542		Y	Advanced Dynamics			Principles and methods for formulating and analyzing mathematical models of physical systems; Newtonian, Lagrangian, and Hamiltonian formulations of particle and rigid and elastic body dynamics; canonical transformations, Hamilton-Jacobi theory; and integrable and nonintegrable systems. Additional topics are explored at the discretion of the instructor.	30	N	Y			Other			H. Goldstein	Classical Mechanics	S	01	O	30	20317	11:00:00	12:20:00	EQUAA A224	T Th	N	N.	Jeremy	Kasdin
																V.I. Arnold	Mathematical Methods of Classical Mechanics													
																C. Lanczos	The Variational Principles of Mechanics													
AST	551		Y	General Plasma Physics I			An introductory course to plasma physics, with sample applications in fusion, space and astrophysics, semiconductor etching, microwave generation, plasma propulsion, high power laser propagation in plasma; characterization of the plasma state, Debye shielding, plasma and cyclotron frequencies, collision rates and mean-free paths, atomic processes, adiabatic invariance, orbit theory, magnetic confinement of single-charged particles, two-fluid description, magnetohydrodynamic waves and instabilities, heat flow, diffusion, kinetic description, and Landau damping. The course may be taken by undergraduates with permission of the instructor.	30	Y	Y			Other			Goldston and Rutherford	Introduction to Plasma Physics	C	01	O	30	21697	10:00:00	10:50:00	JADWH A07	M W F	N	Nathaniel	J.	Fisch
MAE	525		N													Stix and von Goeler	GPPI lecture notes											Hong		Qin
																Hazeltine and Waelbroeck	The Framework of Plasma Physics													
GEO	425		Y	Introduction to Physical Oceanography			The study of the oceans as a major influence on the atmosphere and the world environment. The contrasts between the properties of the upper and deep oceans; the effects of stratification; the effect of rotation; the wind-driven gyres; the thermohaline circulation.	30	N	N	Three to four problems every two weeks.		Final	20	MidTerm Exam	Pond & Pickard	Introductory Dynamical Oceanography, 2nd ed.	L	01	O	30	20027	10:00:00	10:50:00	GUYOT 154	M W F	N	Anand		Gnanadesikan
MAE	425		N											40	Final Exam	Pickard & Emery	Descriptive Physical Oceanography: An Introduction													
														40	Problem Set(s)	Open University Course Team	Ocean Circulation (2001)													
																Open University Course Team	Waves, tides, and Shallow-Water Processes													
MAE	521		Y	Optics and Lasers			An introduction to principles of lasers. Topics include propagation theory, interaction of light and matter, Fourier optics, and a description of operational characteristics of lasers, light scattering, and nonlinear optics.	20	N	Y			Other			Eckbreth, Alan C	Laser Diagnostics for Combustion Temperature & Species	L	01	O	20	20312	13:30:00	14:20:00	EQUAJ J201	M W F	N	Richard	Bryant	Miles
MAE	551		Y	Fluid Mechanics			An introduction to fluid mechanics. The course explores the development of basic conservation laws in integral and differential form; one-dimensional compressible flows, shocks and expansion waves; effects of energy addition and friction; unsteady and two-dimensional flows and method of characteristics. Reviews classical incompressible flow concepts, including vorticity, circulation, and potential flows. Introduces viscous and diffusive phenomena.	20	N	Y			Other					L	01	O	20	20318	10:00:00	11:20:00	EQUAJ J201	M W F	N	Garry	Leslie	Brown
CEE	361		Y	Structural Analysis and Introduction to Finite Element Methods			Basic concepts of matrix structural analysis. Direct stiffness method. Axial force member. Beam bending member. Formation of element stiffness matrix. Assembling of global stiffness matrix. Introduction of boundary conditions. Solution of linear algebraic equations. Special analysis procedures. The finite element method. Introduction and basic formulation. Plane stress and plane strain problems. Plate bending problems. The use and implementation of structural analysis and finite element computer codes using Mathlab is emphasized throughout the course.	20	Y	N	Eight homework sets, two midterm exams, one final project.		Other	30	MidTerm Exam	McGuire & Gallagher, John Wiley	Matrix Structural Analysis	L	01	O	20	20236	11:00:00	12:20:00	FRIEN 109	T Th	N	Jean-Herve		Prevost
MAE	325		N											30	Design Project (s)			P	01	O	30	22365	19:30:00	22:20:00	FRIEN 007	Th	N	Nima		Rahbar
														40	Problem Set(s)	Kwon and Bang, CRC	The Finite Element Method Using MatLab											Jean-Herve		Prevost
																Zienkiewicz, Taylor and Zhu; Elsevier	The Finite Element Method: Its Basis and Fundamentals											Scott	Edward	Sanborn
																		P	02	X	25	22366	19:30:00	22:20:00	MCCOH B59	M	N	Nima		Rahbar
WWS	585	B	Y	Topics in Science, Technology, and Environmental Policy	Living in a Greenhouse: Technology & Policy		These are courses intended to help students develop and apply skills in the application of scientific, technological, and environmental analyses to problems of policy interest. Fall courses are numbered 585, Spring courses are numbered 586.	20	Y	Y			Other					S	01	O	20	23080	19:00:00	22:00:00	ROBEH 015	M	N	Robert	Harry	Socolow
MAE	580		N																											
MAE	527		Y	Physics of Gases			Physical and chemical topics of basic importance in modern fluid mechanics, plasma dynamics, and combustion science: statistical calculations of thermodynamic properties of gases; chemical and physical equilibria; adiabatic temperatures of complex reacting systems; quantum mechanical analysis of atomic and molecular structure and atomic-scale collision phenomena; transport properties; reaction kinetics, including chemical, vibrational, and ionization phenomena; and propagation, emission, and absorption of radiation.	15	N	Y			Other					L	01	O	15	20313	09:00:00	09:50:00	EQUAJ J201	M W F	N	Szymon		Suckewer
MAE	531		Y	Combustion			Chemical thermodynamics, theory of chemical kinetics, oxidation of hydrogen and hydrocarbons, transport phenomena, conservation equations of chemically reacthing flows, Rankin-Hugoniot relations, laminar premixed and diffusion flames, turblent flames, detonation waves, droplet and spray combustion, ignition and extinction, flame stabilization and blowoff, pollutant chemistry.	15	N	Y			Other			SR Turns	An Introduction to Combustion; Concepts and Applications	L	01	O	15	20314	15:00:00	16:20:00	FRIEN 202	M W	N	Chung	King	Law
																I Glassman	Combustion													
																K. Kikao	Principles of Combustion													
MAE	555		Y	Non-Equilibrium Gas Dynamics			Noncontinuum descritpion of transport and reactive flow. The course examins mlecular collisions Bolzmunn equation, and Chapmann-Eskog expansion for near-equilibrium flows; flows with transnational, vibrational and chemical non-equiliburum; shock structure; and plasma with chemical reactions	15	Y	Y			Other			GA Bird	Molecular Gas dynamics and direct simulation	L	01	O	15	20315	11:00:00	12:20:00	FRIEN 306	M Th	N	Yiguang		Ju
																WG Vincenti & CH Kruger Jr	Introduction to Physical Gas Dynamics													
MAE	553		Y	Turbulent Flow			Physical and statistical descriptions of turbulence, and a critical review of phenomenological theories for turbulent flows. The course examines scales of motion; correlations and spectra; homogeneous turbulent flows; inhomogeneous shear flows; turbulent flows in pipes and channels; turbulent boundary layers; calculation methods for turbulent flows (Reynolds stress equations, LES, DNS); and current directions in turbulence research. This course is offered in alternate years.	15	N	Y			Other					L	01	O	15	20319	11:00:00	12:20:00	EQUAJ J201	T Th	N	Alexander	John	Smits
MAE	564		Y	Structural Materials			Stress/strain behavior of materials; dislocation theory and strengthening mechanisms; yield strength; materials selection. Fundamentals of plasticity, Tresca and Von Mieses yield criteria. Case study on forging: upper and lower bounds. Basic elements of fracture. Fracture mechanics. Mechanisms of fracture. The fracture toughness. Case studies and design. Fatigue mechanisms and life prediction methodologies.	15	N	Y			Other					L	01	O	15	23592	15:00:00	16:20:00	COMPU 102	T Th	N	Winston	Oluwole	Soboyejo
MSE	512		N																											