

University Partnership: Kabul University Faculty of Engineering: Supporting the Teaching of Engineering Principles in English

Annexes to the Request For Grant Proposal

Appendix 1: Kabul University Faculty of Engineering Courses

Approved: June 2009

KABUL UNIVERSITY

FACULTY OF ENGINEERING CURRICULA

The abbreviations used here obey the Higher Education Organizations Credit Systems Regulation of Afghanistan year 1383 (equivalent to 2004). The abbreviations are as follows:

AR – Architecture

CE – Civil Engineering

EF – Engineering Faculty (This abbreviation is used for all core common subjects)

ME – Mechanical Engineering

EE – Electrical Engineering

Example: **CE 301** means **C**ivil **E**ngineering Department, Year No.**3** Subject No.**01**. The subject number is not repeated in the same department during all four years.

Course Descriptions

The course descriptions for the Faculty of Engineering include the course number, course title, the number of semester credits and the number of contact periods per week in lecture, recitation and laboratory for each course (a contact period is 45 minutes).

Cr – Credits

Le – Lecture contact periods

Re - Recitation contact periods

Lb - Laboratory contact periods

Revision Records

1st October 6, 1976

2nd April 16, 2006 (From USAID Seminar, held at Kabul University, December 19-21 2005)

3rd November-December 2006 (KSU Partnership Team)

4th June-August 2007 (Approved by Department Faculties, Kabul University)

5th April 2008 changes in EE curriculum approved.

6th July 2008 changes in Architecture curriculum approved.

7th June 23, 2009 changes to accommodate English IV in curricula and other minor adjustments.

The first three semesters of the Engineering curricula are common to all three Engineering Programs so that the assignment of students to the engineering programs can be postponed to the end of the third semester. We recommend that new students be assigned to either Architecture or Engineering based on the results of the Concord Examination. Assignment of students to Civil, Electrical and Mechanical Engineering will take place at the end of the third semester based on academic performance (GPA/Examination Scores) for the first three semesters at Kabul University.

ARCHITECTURE DEPARTMENT

The ten semester curriculum combines the strength of a nine semester studio sequence with the rigor of engineering preparatory courses in Calculus, Chemistry and Physics. Professional courses in Engineering Mechanics, Concrete and Surveying are taken in conjunction with Civil Engineering. Sustainable Environmental Systems forms the foundation for advanced courses in construction and mechanical equipment. Socio-cultural aspects are addressed in a series of courses in Architectural History as well as a foundation course Environmental Design and Society. General studies electives taken outside the college help broaden the curriculum.

Members of the Architecture Department participate in consultation and research ventures as needed by governmental and private agencies. These research activities broaden the practical knowledge of the faculty, staff and students of Architecture.

CIVIL ENGINEERING DEPARTMENT

The principal areas of concentration in Civil Engineering are: Construction, Structures, and Water Resources; while providing a level of basic training in other areas such as Transportation and Geotechnical. The curriculum prepares students to be qualified professional civil engineers while meeting specific requirements of specializations in various fields of civil engineering.

Members of the Civil Engineering Department participate in consultation and research ventures as needed by governmental and private agencies. These research activities broaden the practical knowledge of the faculty, staff and students of Civil Engineering.

ELECTRICAL ENGINEERING DEPARTMENT

The curriculum provides basic training in various fields of electrical engineering with a focus on Power Systems, Communications, and Computers. These are the three areas that are most important for rebuilding of Afghanistan. The program of study prepares the student to be practical generalist in Electrical Engineering while getting deeper exposure to the specializations mentioned above.

Members of the Electrical Engineering Department participate in consultation and research ventures as needed by governmental and private agencies. These research activities broaden the practical knowledge of the faculty, staff and students of Electrical Engineering.

MECHANICAL ENGINEERING DEPARTMENT

The four principal areas of concentration in Mechanical Engineering are: Heat and Power, Machine Design, Manufacturing Engineering, and Management Engineering. The curriculum of the Mechanical Engineering Department is designed to prepare qualified engineers in these areas.

The program of study prepares the student to be a practical generalist in Mechanical Engineering while still meeting specific requirements of specializations.

Members of Mechanical Engineering Department participate in consultation and research ventures as needed by governmental and private agencies. These research activities broaden the practical knowledge

of the faculty, staff and students of Mechanical Engineering.

<u>First Year – Architecture</u>					
First Semester			Second Semester		
Course	Course Name	Units	Course	Course Name	Units
EF 101	English I		EF 121	English II	3
EF 112*	Engineering Calculus I	4	EF 122	Engineering Calculus II	4
EF 115	Engineering Chemistry	4	AR 110	Architectural Drawing	4
EF 104	Introduction to Engineering & Computers	3	EF 124	Engineering Physics I	4
EF 105	Islamic Studies	1	EF 125	Islamic Studies	1
EF 106	History of Afghanistan	1			
	Total:	16		Total:	16

* Students with insufficient preparation in mathematics (an examination will be given at the start of the class) should take EF 102, Trigonometry and College Algebra, before taking EF 112, Engineering Calculus I

<u>Second Year – Architecture</u>					
Third Semester			Fourth Semester		
Course	Course Name	Units	Course	Course Name	Units
AR 201	Architectural Design I	4	AR 202	Architectural Design II	4
AR 214	Thermal Physics for Architects	4	AR 220	History of Architecture I	2
EF 201	English III	3	CE 214	Strength of Materials	4
CE 216	Statics	3	AR 230	Sustainable Environmental Systems	3
AR 211	Sketching	2	EF 221	English IV	3
EF 205	Islamic Studies	1	EF 225	Islamic Studies	1
	Total:	17		Total:	17

<u>Third Year – Architecture</u>					
Fifth Semester			Sixth Semester		
Course	Course Name	Units	Course	Course Name	Units
AR 303	Architectural Design III	5	AR 304	Architectural Design IV	5
AR 321	History of Architecture II	2	AR 331	Construction II	4
AR 330	Construction I	3	AR 332	Mechanical Equipment I	3
AR 311	Computing in Architecture	3	CE 306	Concrete I	3
CE 302	Structural Analysis	4	AR 322	History of Architecture III	2
EF 305	Islamic Studies	1	EF 325	Islamic Studies	1
	Total:	18		Total:	18

<u>Fourth Year – Architecture</u>					
Seventh Semester			Eighth Semester		
Course	Course Name	Units	Course	Course Name	Units
AR 405	Architectural Design V	5	AR 406	Architectural Design VI	5
AR 4xx	Non-Technical Elective	3	AR 440	Site Planning & Design	3
AR 433	Mechanical Equipment II	3	AR 441	City Planning Theory	3
CE 304	Survey I	3	AR 442	Interior Design	3
AR 240	Environmental Design and Society	3	CE 308	Steel Design	3
EF 405	Islamic Studies	1	EF 425	Islamic Studies	1
	Total:	18		Total:	18

<u>Fifth Year – Architecture</u>					
Ninth Semester			Tenth Semester		
Course	Course Name	Units	Course	Course Name	Units
AR 507	Architectural Design VII	5	AR 508	Urban Design	6
AR 543	Topics in Architecture & Urban Theory	3	AR 534	Construction Management	4
AR 544	Project Programming	2		History of Art	2
AR xxx	Technical Elective	3	AR xxx	Technical Elective	3
	Non-Technical Elective	3		Non-Technical Elective	3
	Total:	16		Total:	18

Total Credit Hours 172

- Technical electives are courses within the Faculty of Engineering
- Non-Technical electives are taken outside the Faculty of Engineering

First Year - Engineering

First Semester

Course	Course Name	Units	Related Departments		
			CE	ME	EE

EF 101	English I	3	X	X	X
EF 112*	Engineering Calculus I	4	X	X	X
EF 115	Engineering Chemistry	5	X	X	X
EF 104	Introduction to Engineering & Computers	3	X	X	X
EF 105	Islamic Studies	1	X	X	X
EF 106	History of Afghanistan	1	X	X	X
Total:		17	17	17	17

* Students with insufficient preparation in mathematics (an examination will be given at the start of the class) should take EF 102, Trigonometry and College Algebra, before taking EF 112, Engineering Calculus I

Second Semester

Course	Course Name	Units	Related Departments		
			CE	ME	EE
EF 121	English II	3	X	X	X
EF 122	Engineering Calculus II	4	X	X	X
EF 123	Computer Programming	3	X	X	X
ME 215	Computer Aided Design	3	X	X	X
EF 124	Engineering Physics I	4	X	X	X
EF 125	Islamic Studies	1	X	X	X
Total:		18	18	18	18

Second Year - Engineering

Third Semester

Course	Course Name	Units	Related Departments		
			CE	ME	EE
EF 201	English III	3	X	X	X
EF 212	Engineering Calculus III	4	X	X	X
EF 214	Engineering Physics II	4	X	X	X
ME223	Thermodynamics I	3	X	X	X
CE 216	Statics	3	X	X	X
EF 205	Islamic Studies	1	X	X	X
Total:		18	18	18	18

Fourth Semester

Course	Course Name	Units	Related Departments		
			CE	ME	EE
EF 221	English IV	3	X	X	X
EF 222	Engineering Differential Equations	4	X	X	X
ME 226	Dynamics	3	X	X	X
EE 224	Circuit Analysis I (Lab)	3	X	X	X

CE 214	Strength of Materials	4	X	X	
EE 202	Intro to Computer Engg (Lab)	4			X
EF 225	Islamic Studies	1	X	X	X
Total:		18	18	18	18
<u>Third Year – Civil Engineering</u>					
Fifth Semester			Sixth Semester		
Course	Course Name	Units	Course	Course Name	Units
CE 301	Technical Elective (Engineering Economy)	3	CE 305	Soil Mechanics	4
CE 302	Structural Analysis	4	CE 306	Concrete I	4
CE 303	Hydrology	3	CE 307	Hydraulics	4
ME 309	Fluid Mechanics	4	CE 308	Steel Design	3
CE 304	Survey I	3	CE 309	Surveying II	3
EF 305	Islamic Studies	1	EF 325	Islamic Studies	1
Total:		18	Total:		19

<u>Fourth Year – Civil Engineering</u>					
Seventh Semester			Eighth Semester		
Course	Course Name	Units	Course	Course Name	Units
CE 410	Concrete II	4	CE 417	Wastewater Eng	3
CE 411	Technical Elective (Pavement Design)	3	EF 421	Non Technical Elective (Renewable Energy Sources)	3
CE 412	Water Supply	3	CE 418	CE Design Project	3
CE 413	Construction Methods & Materials	3	CE 419	Technical Elective (Introduction to Earthquake Engineering)	4
CE 415	Transportation	3	CE 420	Foundation Engineering	4
CE 416	Geology	3	EF 425	Islamic Studies	1
EF 405	Islamic Studies	1			
	Total:	20		Total:	18

Total Credit Hours Civil Engineering 146

<u>Third Year – Electrical Engineering</u>					
Fifth Semester			Sixth Semester		
Course	Course Name	Units	Course	Course Name	Units
EE 302	Microcontrollers (Lab)	4	EE 303	Design of Digital Systems	3
EE 324	Circuit Analysis II	3	EE 308	Signals and Systems	3
EE 325	Electronics I (Lab)	4	EE 326	Electronics II (Lab)	4
EF 312	Applied Matrix Theory	3	EE 355	Energy Conversion II (Lab)	4
EE 345	Energy Conversion I	4	EF 320	Engineering Management I	3
EF 305	Islamic Studies	1	EF 325	Islamic Studies	1
	Total:	19		Total:	18

Technical Electives:

EE 486 Power Systems II

EE 461 Communication Systems II

EE 414 Wiring Design

EE 490 Industrial Projects

Add more in the future based on expertise and availability of resources

<u>Fourth Year – Electrical Engineering</u>					
Seventh Semester			Eighth Semester		
Course	Course Name	Units	Course	Course Name	Units
EE 460	Communication Systems I	3	EF 421	Renewable Energy Sources	3
EE 485	Power Systems I	3	ME 419	Management II	3
EE 424	Power Electronics	3	EE 4xx	Technical Elective	3
EE 417	Automatic Controls (Lab)	4	EE 4xx	Technical Elective	3
EE 404	Electromagnetic Field Theory	3	EE 4xx	Technical Elective	3
EF 405	Islamic Studies	1	EF 425	Islamic Studies	1
	Total:	17		Total:	16

Total Credit Hours in Electrical Engineering 141

<u>Third Year – Mechanical Engineering</u>					
Fifth Semester			Sixth Semester		
Course	Course Name	Units	Course	Course Name	Units
EF 312	Applied Matrix Theory	3	ME 308	Dynamics of Machines	3
ME 305	Thermodynamics II	3	ME 3xx	Technical Elective (Engineering Materials)	4
EE 319	Electric Circuits & Machines	4	ME 310	Manufacturing Processes II	4
ME 309	Fluid Mechanics	4	EF 320	Engineering Management I	3
ME 306	Manufacturing Processes I	3	ME 325	Instrumentation Laboratory	3
EF 305	Islamic Studies	1	EF 325	Islamic Studies	1
	Total:	18		Total:	18

Fourth Year – Mechanical Engineering					
Seventh Semester			Eighth Semester		
Course	Course Name	Units	Course	Course Name	Units
ME 412	Internal Combustion Engines	3	ME 424	HVAC	3
ME 413	Heat Transfer	3	ME 445	Manufacturing Processes III	3
ME 414	Finite Element Analysis	4	ME 419	Management II	3
ME 415	Elements of Machine Design	3	ME 435	Industrial Design Projects	4
ME 417	Automatic Controls (Lab)	4	ME 4xx	Technical Elective (Renewable Energy Sources)	3
EF 405	Islamic Studies	1	EF 425	Islamic Studies	1
	Total:	18		Total:	17

Total Credit Hours in Mechanical Engineering 142

Description of Courses:

AR 110 Architectural Drawing (Cr. 4, Lb. 6)

Foundation studies introducing principles, processes, and vocabularies for depicting constructed form and space. Instruction in two and three dimensional visualization of objects and spaces. Instruction in the use of instrument-aided drawing, freehand drawing, and model building to represent and communicate design ideas at different scales of observation.

AR 201 AR 202 Architectural Design I & II (Cr. 4, Lb. 10)

Architectural design focusing upon the application of elements and principles of form and space in design. Instruction in the synthesis of basic social, functional, technical, and aesthetic factors in design. Continued integration of material from Architectural Drawing and instruction in non-digital techniques for visually representing design ideas.

AR 211 Sketching (Cr. 2, Lb. 4)

Freehand sketching taught to promote extensive visual exposure, perception and literacy. Basic sketch construction skills including grids, frames and shapes with the addition of tone, texture and detail.

AR 214 Thermal Physics for Architects (Cr. 4, Le. 3, Re. 2, Lb. 3)

Emphasis upon temperature, heat, First Law of Thermodynamics, kinetic theory of gasses, entropy and the Second Law of Thermodynamics. Special attention will be given to architectural applications of this knowledge.

Prerequisite: EF 110 (Engineering Physics I).

AR 240 Environmental Design and Society (Cr. 3, Lc. 3)

Instruction in behavioral, cultural, and ecological factors that contribute to successful environmental design; considers how the design process is affected by a conceptual point of view. Case studies from architecture, landscape architecture, and interior design.

AR 220 AR 321 History of Architecture I & II (Cr. 2, Lc. 2)

Survey of the architectural and urban history of the world from ancient to contemporary times. Distribution of course content will reflect the explosion of knowledge in recent centuries. Middle Eastern architectural history will be studied primarily from the viewpoint of its interrelationships with the rest of the world.

AR 322 History of Architecture III (Cr. 2, Lc. 2)

Survey of the architectural and urban history of the Islamic World from ancient to contemporary times with an emphasis upon the heritage of Afghanistan and the surrounding region.

AR 230 Sustainable Environmental Systems (Cr. 3, Lc. 3)

Instruction in bioclimatic and ecological design principles as a basis for architectural and landscape design. Emphasis on passive solar heating and cooling and daylighting.

AR 303 AR 304 Architectural Design III & IV (Cr. 5, Lb. 12)

Architectural design in response to environment; client and community restraint. The increased emphasis upon the material and constructional aspects of design. Development of building programs and the synthesis of functional, technical, and aesthetic considerations in the design of structures for human use. Introductory use of computer aided design.

AR 311 Computer Applications in Architecture (Cr. 3, Lc. 2, Lb. 2)

Introduction to technical, representational, and theoretical issues of digital design tools in architecture. Acquisition of skills to independently employ three-dimensional design, modeling, rendering, image processing, two-dimensional drawing, and other applications.

AR 330 AR 331 Construction I & II (Cr. 3, Lc. 3)

Courses that develop an understanding of how materials and systems assembly reinforce and extend the intentions of the designer. Study of the strategies and techniques for integration and coordination of the building components.

AR 332 AR 433 Mechanical Equipment I & II (Cr. 3, Lc. 3)

Criteria for selection and application of natural and mechanical environmental control systems in architecture. Focus on the integration of thermal, illumination, sanitary, movement, and acoustical systems with the building fabric and the natural environment. Contemporary and developing approaches are explored.

AR 405 Architectural Design V (Cr. 5, Lb. 12)

Architectural design as urban intervention. Investigations of the interdependencies of architecture within an urban context.

AR 406 Architectural Design VI Cr. 5. Lb. 12)

A design studio that integrates a design project with design development, (including structural, mechanical, lighting, and movement systems) and construction documentation.

AR 440 Site Planning and Design (Cr. 3 Lc. 3)

Theory, principles, and elements of site planning and design. Lectures, readings, short problems, and site visits dealing with site analysis, ecological considerations, grading, drainage, circulation and parking, lighting, planting design, materials and details, management and maintenance, and cost factors.

AR 441 City Planning Theory (Cr. 3, Lc. 3)

Examination of the principles and process of regional and community planning, including historical development of growth patterns and form, the role of architects, landscape architects, geographers, politicians and government, engineers, and planners in the historical development of regions and cities.

AR 442 Interior Design (Cr. 3, Lc. 3)

This course will include programming methodology and its relationship to the design and organization of interior space. Emphasis will be placed on the appropriate selection of furniture, finishes, fixtures, and equipment within the context of their relationships to form, function, task and users' needs.

AR 507 Architectural Design VII (Cr. 5, Lb. 12)

This studio represents the cumulative knowledge of the architectural program. It calls for the student to demonstrate mastery in systematic and comprehensive thinking, project research, application of resources, architectural design, and communication of the total process.

AR 543 Topics in Architectural and Urban Theory (Cr. 3, Lc. 3)

Analysis of theories and philosophies in the design professions, including those in related societal and technological fields as they relate to architectural and urban design.

AR 544 Project Programming (Cr. 3 Lc. 2, Lb 2)

An introduction to basic philosophies and methodologies for architectural programming; emphasis on the comparative evaluation of different strategies and their integration within the process of design. This course creates the program to be used for Urban Design.

AR 508 Urban Design (Cr. 5, Lb. 12)

This studio combines the knowledge gained from the architectural studios with the knowledge of other disciplines. An investigation of elements of physical design in relation to social, economic, and political forces contributing to urban planning and design.

AR 534 Construction Management: (Cr. 4, Le. 4)

This course introduces concepts relating to the nature of the construction industry. Construction contracts, legal and management organization of construction companies. Safety programs and the concepts of construction management relationships. An investigation to develop construction project estimates. An investigation of the planning activities and scheduling techniques for construction projects. Practical considerations in developing of QA/QC systems. Documentation, Archiving, and Reporting.

Prerequisite: AR 331 Construction II.

EF 101 English I (Cr. 3, Re.4)

A preparatory course including a thorough review of major grammatical patterns, reading of semi-technical, simplified selections for rapid expansion of vocabulary, and an introduction to the techniques of organizing spoken and written materials.

Prerequisite: None.

EF 102 Math I (Cr. 3, Lc.3, Re.2)

Trigonometry and College Algebra. This course will serve as the course required for those who need preparation for taking Calculus I (EF 112)

EF 104 Introduction to Engineering & Computers (Cr.3, Lc.2, Re.2)

Accuracy and errors of measurements, least squares, graphs, number systems, logarithms, geometry of small deformations, force vectors, concept of work and energy, lab measurements of length, force, scientific calculator, input unit, central processing unit, output units, basic computer operations, system software and application software, machine language, compiler, introduction to spread sheets (Ms. Excel, Word processing and Power Point).

Prerequisite: None

EF 105 Islamic Studies (Cr.1, Lc.1)

This course is usually a review of the Islamic subjects.

EF 106 History of Afghanistan (Cr.1, Lc.1)

Modern History of Afghanistan.

EF 112 Engineering Calculus I (Cr. 4, Lc.4, Re.2)

The study of differential and integral calculus with emphasis on application in the natural and physical sciences.

Prerequisite: EF 102 or equivalent preparation

EF 115 Engineering Chemistry (Cr.5, Lc.4, Re.2, Lb.3)

Fundamental concepts in chemistry including: chemical change, atomic structure, periodic classification of elements, chemical bond, stoichiometry, ideal gas equation of state, thermo chemistry water and the liquid state, solutions, molecular and atomic weight, entropy, free energy, environmental chemistry, laboratory exercises.

Prerequisite: None

EF 121 English II (Cr.3, Re.4)

A continuation of English I grammar review, expansion of semi-technical and general vocabulary with adapted materials, study of reading and speaking skills, and introduction to the form and method of reporting scientific experiments.

Prerequisite: EF 101 (English I)

EF 122 Engineering Calculus II (Cr.4, Lc.4, Re.2)

Fundamental Theory of Calculus, Integration Techniques and its application including volume, arc length, surface area, parametric equations, sequences and infinite series and polar coordinates.

Prerequisite: EF 112 (Calculus I)

EF 123 Computer Applications in Engineering (Cr.3, Lc.1, La.6)

The development and application of computer techniques to the problems of design and analysis in engineering, including computer programming (abstraction and problem solving; algorithms; control structures; input/output; functions; arrays and array processing). Object-oriented, C++, Programming.

Prerequisite: EF 104 (Introduction Engineering & Computers)

EF 124 Engineering Physics I (Cr.4, Lc.3, Re.2, La.3)

Equilibrium, movement of Force, rectilinear motion, Newton's laws, gravitation, motion in a plane, work and energy, rotation, harmonic motion, Temperature expansion, quantity of heat, first and second laws of thermodynamics related laboratory exercises.

Prerequisite: EF 104 (Introduction to Engineering & Computers)

EF 125 Islamic Studies (Cr.1, Lc.1)

Continuation of EF 105.

EF 201 English III (Cr.3, Re.4)

Intensive work on specific reading skills using short adapted materials dealing with a broad range of new scientific developments.

Prerequisite: EF 121 (English II)

EF 205 Islamic Studies (Cr.1, Lc.1)

Continuation of EF 125.

EF 221 English IV (Cr.3, Re.4)

A continuation of English III. Intensive work on specific reading skills using short adapted materials dealing with a broad range of new scientific developments.

Prerequisite: EF 201 (English III)

EF 225 Islamic Studies (Cr.1, Lc.1)

Continuation of EF 205.

EF 212 Engineering Calculus III (Cr.4, Le.4, Re.2)

Introduction to vectors and matrices. Calculus of several variables and vector functions. Line and surface integrals. Theories of Green, Gauss and Stokes. Application to Physical Process.

Prerequisite: EF 122 (Calculus II)

EF 214 Engineering Physics II (Cr.4, Le.3, Re.2, Lb.3)

Wave motion, acoustical phenomena, Coulomb's Law, the electric field, electric potential, capacitance, current, resistance, Ohm's Law, D-C circuits, lights and related laboratory exercises.

Prerequisite: EF 124 (Physics I)

EF 222 Engineering Differential Equations (Cr.4, Lc.4, Re.2)

Introduction to elementary ordinary Differential equations with applications to physical processes, emphasis on first and second order equations. Systems of linear differential equations. Laplace transforms.

Prerequisite: EF 212 (Calculus III)

EF 305 Islamic Studies (Cr.1, Lc.1)

Continuation of EF 225.

EF 325 Islamic Studies (Cr.1, Lc.1)

Continuation of EF 305.

EF 312 Applied Matrix Theory (Cr. 3, Le. 2, Re. 3)

Matrix algebra, solutions to systems of linear equations, determinants, vector spaces, linear transformations, Eigen values, linear programming, approximation techniques.

Prerequisite: EF 212 (Calculus III).

EF 320 Engineering Management I (Cr. 3)

Basic functions in an industrial organization and their interrelationships; management considerations involving product, process, plant, and personnel. Economic basis for engineering decisions making.

Prerequisite: none

EF 405 Islamic Studies (Cr.1, Lc.1)

Continuation of EF 325.

EF 425 Islamic Studies (Cr.1, Lc.1)

Continuation of EF 405.

EF 421 Renewable Energy Sources (Non Technical Elective) (Cr.3, Lc.2, Re.2)

This course provides a comprehensive overview of renewable energies, including solar energy, wind power, hydropower, fuel cells, biomass, and alternative transportation options. Principles of solar home design, solar hot water, pool and space heating and solar cooling for both new and existing construction. Assessing the viability of a wind power, hydropower or biomass system for a given site. Impact of government regulations on the use of renewable energies. Analyzing renewable energy systems and calculating savings fractions, backup energy needs, financing options, and economic analyses. Investigating the potentials of renewable energy technologies to help solve environmental and economic problems within society.

Prerequisite: None

CE 214 Strength of Materials (Cr.3, Lc.3, Re.3)

Loads; Tension, Compression, and Shear of materials under loads; Axially loaded members, Flexural members, Torsional members. Shear forces and Bending Moments. Analysis of stress and strain. Structure of Materials. Elastic, inelastic, and time-dependent behavior. Chemical effects of materials. Combined loading conditions; buckling. Statically indeterminate beams.

Prerequisite: EF 216 (Statics)

CE 216 Statics (Cr.3, Lc.3, Re.2)

Statics of Particles. Rigid bodies: equivalent systems, equilibrium. Centroids and center of gravity. Static analysis of trusses, frames, and machines. Friction. Area moments of inertia. Determinate and Indeterminate systems. Loads, shear and bending moments.

Prerequisite: EF 122 (Calculus II) and EF 124 (Physics I)

CE 301 Vibration (Cr.3, Lc.3)

Dynamic disturbances, free and forced vibration of structures with single degree and multi degree of freedom, elastic and inelastic beams and responses of structures to dynamic loading.

Prerequisite: EF 218 (Ordinary Differential Equations)

CE 302 Structural Analysis (Cr.4, LC.4, Re.2)

Analysis of determinate and indeterminate structures. Loading developed in structural members. Influence lines for statically determinate structures. Determination of deflections. Force method analysis. Analysis of plane trusses, beams, and plane frames by direct stiffness method. Moment distribution method analysis. Approximate methods analysis.

Prerequisite: CE 214 (Strength of Materials)

CE 303 Hydrology (Cr.Lc.2, Lb.3)

Hydrologic cycle, hydrometeorology precipitation, infiltration, evaporation, ground water, surface runoff, floods and droughts, snow and ice. Hydrology Lab: Lab and field trips and practical problems with emphasis on Afghanistan problems.

Prerequisite: None

CE 304 Surveying I (Cr.3, Lc.1, Lb.6)

Basic surveying operations and computations. Theories of errors and their analysis. Fundamental concepts of horizontal, vertical and angular measurement. Introduction to instruments. Types of leveling. Direction of a line. Horizontal and vertical control systems.

Prerequisite: Algebra and Trigonometry

CE 305 Soil Mechanics (Cr.4, Lc.3, Lb.3)

Properties of earth materials, application of mechanic principles to strength and deformation characteristics of soils. Consolidation, seepage and shear strength. Soil Lab: Laboratory testing for determining the basic properties of earth materials.

Prerequisite: CE 214 (Strength of Materials)

CE 306 Concrete I (Cr.4, Lc.3, Lb.3)

Materials and specifications, analysis and design of single and double reinforced rectangular and T-beam (ultimate strength method), Retaining walls, continuous beam and one way slabs, introduction to different types of slabs, columns, footings, reinforced concrete.

Prerequisite: CE 302 (Structural Analysis)

CE 307 Hydraulics (Cr.4, Lc.4, Lb.3)

Open channel and pipe flow, reservoir planning, hydraulic structures, water power and hydraulic machinery, sediment transportation. Hydraulics Lab: Experiments on free surface flow, pipe flow and hydraulics machinery.

Prerequisite: Fluid Mechanics (after Implementation of the 4th revision)

CE 308 Steel Design (Cr.3, Lc.2, Re.2)

Properties of Structural Steel, Briefly Introduction of Steel Sections, Weld connection, Rivet connection, Bolt connection, Tension Members, Compression Members, Simple Beam Design, Columns Design, Frame Design, Joint and Section Methods, Truss Design, Hanger Design, Individual and Group Projects during the course and Site Visits.

Prerequisite: *CE 302 (Structural Analysis)*

CE 309 Surveying II (Cr.3, Lc.1, Lb.6)

Field operations with theodolite and transit. Travers surveys and computations. Horizontal and vertical curves. Topographic surveys. Photogrammetry. Earth works. Municipal surveys. Constructions surveying. Fundamentals of road surveying.

Prerequisite: CE 304 (Surveying I)

CE 410 Concrete II (Cr.4, Lc.3, Lb.3)

Properties of plain concrete, two way and flat slabs, pre-stressed concrete, composite design.

Prerequisite: CE 306 (Concrete I)

CE 411 Technical Elective (Dam Design) (Cr.3, Lc.3)

Sub-surface exploration, design and analysis of earth dam, design and analysis of gravity dam, Foundation treatment, control of cracks, design of spillway and stilling basin.

Prerequisite: CE 214 (Strength of Materials), CE 305 (Soil Mechanics), CE 307 (Hydraulics)

CE 412 Water Supply (Cr.3, Lc.2, Lb.3)

Study of the principles and unit processes involved in water and air resources problems, including water sources, purification principles, distribution and air pollution control. Experiments on chemical and physical properties of water.

Prerequisite: CE 307 (Hydraulics), EF 215 Chemistry I and EF 217 Chemistry II

CE 413 Construction Methods and Materials (Cr.3, Lc.3)

Residential and commercial building techniques and materials will be discussed. Basic materials and installation methods are studied. Site work, concrete, masonry, metals, and finishes will be presented. Applicable codes, specifications, and cost estimating will be discussed as they relate to various construction methods.

CE 415 Transportation (Cr.3, Lc.2, Lb.3)

Analysis of basic characteristics of Transportation Engineering System and the elements influencing these characteristics: Drivers, vehicles, pedestrians, flow, density, speed, travel time, delay, stream flow, intersection, performance, capacity, accidents, traffic demand, parking, planning and Transportation System Management.

Prerequisite: CE 305 (Soil Mechanics) and CE 309 (Surveying II)

CE 416 Geology (Cr.3, Lc.2, Lb.3)

Introduction to the study of minerals and rocks, geologic processes, geologic structures, geologic history and geophysics particularly designed for needs of civil engineering students. Geology Lab: Identification of minerals and rocks observation and map exercises.

Prerequisite: EF 215 (Chemistry I), EF 103 (Technical Drawing) and CE 304 (Surveying I)

CE 417 Waste Water Engineering (Cr.3, Lc.3, Lb.3)

Principles of waste water and solid, waste handling, treatment and reuse and a study of the factors involved in disposal of waste water, functional design of modern water and air purification systems. Lab: Experiments on chemical and physical properties of sewage.

Prerequisite: CE 307 (Hydraulics), EF 215 (Chemistry I), EF 217 (Chemistry II) and EF 303 (Hydrology)

CE 418 Civil Engineering Design Project (Cr.3, Lc.1, Lb.4)

Feasibility study and detail design of a given project.

Prerequisite: Consent of instructor

CE 420 Foundation Engineering (Cr.4, Lc.3, Lb.3)

Application of principles of soil mechanics and geology to the analysis, design and construction of shallow and deep foundations, retaining walls, earth structures stability of un-retained slope, and excavations. Foundation Lab: Subsurface soil explorations, undisturbed soil sampling and laboratory testing of earth materials.

Prerequisites: CE 306 (Concrete I), CE 305 (Soil Mechanics)

EE 202 Introduction to Computer Engineering. (Cr.4, Lc.3, Lb.3)

Simple coding schemes, Boolean algebra fundamentals, elements of digital building blocks such as gates, flip-flops, shift registers, memories, etc, basic engineering aspects of computer architecture. Prerequisite: EF 123

EE 224 Circuit Analysis I (Cr.3, Lc.2, Lb.3)

An introduction to linear circuit theory; analysis of linear circuits containing resistance, inductance, and capacitance.

Prerequisites: EF 214 (Physics II), EF 212 (Calculus III)

EE 302 Microcontrollers. (Cr.4, Lc.3, Lb.3)

Architecture, assembly language, programming, serial and parallel input/output and applications.
Prerequisites: EF 123, EE 201.

EE 303 Design of Digital Systems. (Cr.3, Lc.3)

Design of combinational and sequential systems and peripheral interfaces. Emphasis is placed on hardware description languages, computer-aided design tools and simulations.

Prerequisite: EE 201.

EE 308 Signal and Systems. (Cr.3, Lc.3)

An introduction to linear system fundamental concepts and analytical methods. Analytical concepts presented are signal representation and classification, convolution, Fourier analysis signal sampling, and discrete transforms.

Prerequisites: EF 123, EE 324.

EE 319 Electric Circuits and Machines (Cr. 4, Lc. 2, Lb. 6)

Principles of direct-current circuits and machines, alternating-current circuits and machines, electronics, and application to instrumentation and control.

Prerequisite: EF 214 (Physics II).

EE 324 Circuit Analysis II. (Cr.3, Lc.3)

Analysis of electric circuits using differential equations, transform techniques and linear algebra.
Prerequisites: EF 222, EE 224.

EE 325 Electronics I. (Cr.4, Lc.3, Lb.3)

Fundamentals of electronic components, devices, and circuits.

Prerequisite: EE 224.

EE 326 Electronics II. (Cr.4, Lc.3, Lb.3)

Continuation of Electronics I.

Prerequisites: EE 324, EE 325.

EE 345 Energy Conversion I. (Cr.4, Lc.3, Lb.3)

Energy conversion principles and their application to electric energy converters operating in the static and the dynamic mode.

Prerequisites: EE 304, EE 324.

EE 355 Energy Conversion II. (Cr.4, Lc.3, Lb.3)

Practical aspects of electrical circuits, transformers, and electrical motors and generators.

Prerequisite: EE 345.

EE 404 Electromagnetic Field Theory. (Cr.3, Lc.3)

Vector analysis, electrostatics, magnetostatics, Faraday's law, Maxwell's equations, and applications.

Prerequisites: EF 222, EE 224.

EE 414 Wiring Design

EE 417 Automatic Control. (Cr. 4, Le. 3, La. 3)

Modeling, analysis, and design of control systems.

Prerequisites: EE 224, ME 226.

EE 424 Power Electronics. (Cr.3, Lc.3)

Theory and application of semiconductor devices to the control and conversion of electric power, control of DC and AC machines, design of electronic power circuits such as controlled rectifiers, converters and inverters, using diodes, diacs, thyristors, triacs, and power transistors.

Prerequisites: EE 326, EE 345.

EE 460 Communication Systems I. (Cr.3, Lc.3)

Introduction to the analysis and design of analog and digital communication systems. Topics include analog and digital modulation schemes, digital encoding of messages, mathematical modeling of communication systems, noise in communication links, and calculation of performance measures for practical links.

Prerequisite: EE 308.

EE 461 Communication Systems II. (Cr.3, Lc.3)

Analysis and design of digital communications systems. Topics include signal spaces, the derivation of optimum receivers for the white noise channel, modeling of band-pass systems, determination of the power spectrum of a random digital signal, multiple access methods, fading channels, error correction codes, and simulation of practical digital transmission systems.

Prerequisite: EE 460.

EE 485 Power Systems I. (Cr.3, Lc.3)

A comprehensive study of modeling of the electric power system components and computer simulation of interconnected power systems in steady state. Vector-matrix descriptions and computer solutions are emphasized.

Prerequisite: EE 345.

EE 486 Power Systems II. (Cr.3, Lc.3)

Analysis of symmetrical unsymmetrical faults on power systems using symmetrical components techniques. Study of protective relaying for protection of power systems against faults. Vector-matrix descriptions and computer solutions are emphasized.

Prerequisite: EE 485.

EE 490 Industrial Projects (Cr. 3, Re. 3)

ME 215 Computer-Aided Design (Cr. 3, Le. 1, Lb. 6)

Technical sketching, study of basic principles of projective geometry, multiview drawings, pictorials, reading and interpreting drawings, introduction to Computer-Aided Design, sectioning, dimensioning, Designing Parts and Assemblies using Solid Works.

Prerequisite: EF 104 (Introduction to Engineering & Computers).

ME 223 Thermodynamics I (Cr.3, Lc.3, Re.2)

Thermodynamics concepts, macroscopic and microscopic, systems of units, temperature scales,. First law of Thermodynamics, energy, work and heat, steady flow energy equations, properties of a pure substance, gas laws, Carnot cycle, second law of thermodynamics, entropy, gas tables, combination of the first and second laws, bi-phase mixtures, steam tables.

Prerequisites: EF 122 (Engineering Calculus II) and EF 115 (Engineering Chemistry)

ME 226 Dynamics (Cr.3, Lc.3, Re.2)

Kinematics of a particle, Kinematics of a rigid body, motion in moving coordinate system, dynamics of a particle, work, kinetic energy and potential energy, dynamics of a system of particles, mass center motion impulse, linear and angular momentum, moments of inertia, dynamics of rigid bodies, Euler's equations of motion, work and energy, plane motion of a rigid body, vibrations.

Prerequisite: CE 216 (Statics)

ME 305 Thermodynamics II (Cr.3, Lc.3, Re.2)

Non-reactive mixtures, psychronotriecs, reactive systems, combustion and expanders, vapor cycles, Rankine, reheat and regeneration, modern thermal power plants, gas power cycles, Otto, Diesel, and Brayton, modern internal combustion engines, jet and rocket engines.

Prerequisite: ME 223 (Thermodynamic I)

ME 306 Manufacturing Processes I (Cr.3, Lc.1, Lb.6)

The application of foundry casting operations, heat treating, electric and arc welding and machining for the manufacture of metal, plastic, and wood components. As part of the laboratory activity, visits will be made to nearby manufacturing firms to study processes that are available. Students will have the opportunity to use various manufacturing machines to make a useful object (vice or similar object).

Prerequisite: None.

ME 308 Dynamics of Machines (Cr.4, Lc.3, Lb3)

Extension and application of principles of dynamics to the analysis of machines, simple harmonic motion, static and inertia force analysis, balancing of rotors and engines, critical shrilling speed, shaking forces design of flywheels, governors, introduction to mechanical vibration.

Prerequisite: ME 307 (Kinematics)

ME 309 Fluid Mechanics (Cr.4, Lc.4, Lb.2)

Viscosity, flow classification, fluid statics, pressure variation, manometry, basic system laws, relation between system and control volume, conservation of mass for a control volume, momentum equations, conservation of energy, continuity equation, acceleration of a fluid particle, Euler's equations in streamline coordinates, dimensional analysis, laminar viscous flow between parallel plates, laminar viscous flow in a circular pipe, head loss, pope flows, flow measurement, fluid machinery, boundary layer concept, momentum integral equation, laminar boundary flow layer on a flat surface, turbulent boundary layer, pressure gradient effects, flow about immersed bodies, lift and drag, introduction to compressible flow, speed of sound, 1 D flow in a converging-diverging nozzle.

Prerequisite: None.

ME 310 Manufacturing Processes II (Cr.4, Lc.3, Lb.6) - (Computer-Aided Manufacturing)

Concepts in CAM, integrated control of machine tools and transport devices with production control. Concepts of CAM and automated assembly in small lot production environment. Integration of Computer-Aided Design and Computer-Aided Manufacturing. Students will have the opportunity in the laboratory to automate the manufacturing of parts they have designed with Solid Works.

Prerequisite: ME 306 (Manufacturing Processes I).

ME 311 Vibration (Technical Elective) (Cr.3, Lc.2, Re.2)

Newton-Euler equations, Power equation, generalized coordinates and forces, Lagrange's Equations, Linearization of EOM's, Influence coefficients and flexibility matrix, Single DOF systems, Single DOF and undamped multi DOF systems, Rigid body modes and beating response, Damped multi DOF systems, Second order continuous systems, Fourth order continuous systems, Modal uncoupling, Harmonic response of discrete systems, Periodic response of discrete systems, Convolution integral solution for single DOF systems, Forced response using modal uncoupling, Eigen value bounds and sensitivities, Rayleigh's method for continuous systems, Numerical convolution.

ME 325 Measurement and Instrumentation Laboratory. (Cr. 3, Le. 1, La. 6)

Theory and application of mechanical engineering measurements, instrumentation, and computer-based data acquisition.

Prerequisites: EF 123 (Computer Programming), ME 223 (Thermodynamics I), and EE 319 (Electric Circuits and Machines).

ME 412 Internal Combustion Engines (Cr.3, Lc.2, Lb.2)

Application of thermodynamics, fluid mechanics and heat transfer to processes in internal combustion engines. Intake and exhaust processes in engines. Spark-ignition (SI), compression-ignition (CI), and alternate engines. Discussion of engine design and performance to complement lectures. Laboratory work on SI and CI engines. Current challenges facing engine designers.

Prerequisite: ME 305 (Thermodynamic II)

ME 413 Heat Transfer (Cr.3, Lc.3, Re.2)

Concepts of heat transfer, conductive heat transfer, steady one dimensional and two-dimensional conduction, unsteady state heat condition. Natural convection, forced convection heat transfer(inside tubes, ducts, over exterior surfaces), radiation heat transfer, combined modes of heat transfer, heat exchangers.

Prerequisite: ME 223 (Thermodynamics I)

ME 414 Finite Element Analysis (Cr. 4, Le. 3, Re. 3)

The application of the finite element method to the solution of engineering problems. Topics include introductions to the methods, linear elastic stress analysis, thermal analysis, and modeling limitations and errors. Commercial computer codes are used in the applications.

Prerequisites: CE 214 (Strength of Materials), Concurrent: ME 413 (Heat Transfer).

ME 415 Elements of Machine Design (Cr.3, Lc.2, Lb.2)

Application of fundamental principles for the correct design of the separate elements of machines. Some of the elements considered are shafts, springs, screws, brakes, clutches, bolts, bearings and gears.

Prerequisite: CE 214 (Strength of Materials) and ME 226 (Dynamics)

ME 416 Micro Hydro Power (Technical Elective) (Cr.3, Lc.2, Lb.2)

Introduction to micro-hydro power, components of a power plant, site survey, community participation, basic hydraulics, basic economics, layout and cost calculation 1: Penstock, wires, Layout and cost calculation 2: Turbine, civil works 1: Intake, silt basins, forebay tank, Civil works 2: Channel, powerhouse, installing turbine and penstock, CFT runner and nozzle dimensions, CFT design and manufacturing, Electric load controllers and alternatives, drive systems, electrical power 1: Basics, generators, 2: Switchgear, transmission lines, operation and maintenance, commissioning and testing.

ME 417 Automatic Controls (Cr. 4, Le. 3, La. 3)

Introduction to modeling and control of dynamic systems encountered by engineers. Topics include basic linear systems modeling and analysis; feedback control; time response and stability of dynamic systems; introduction to root locus and frequency response design.

Prerequisites: EF 222 (Ordinary Differential Equations), EF 123 (Computer Programming), and ME 226 (Dynamics). Pr. or conc.: ME 325 (Measurement and Instrumentation Laboratory).

ME 419 Engineering Management II (Cr.3, Lc.3)

Inspection, quality control, quality assurance, quality management, planning, organizing, leading and controlling. Reasons for quality costing, quality cost categories, collection cost figures, cost presentation to management. Managing groups of employees in engineering settings, theory of organization design; designing engineering and technological organizations; professionalism and ethical considerations in engineering.

ME 424 HVAC (Heating Ventilation and Air-conditioning) (Cr.3, Lc.2, Re.2)

The psychometric chart and tables of air properties, psychometric processes for buildings, thermal comfort, air quality and ventilation, fundamentals of fluid mechanics in building systems, pressure losses, in liquid and air systems, prime movers, flow measurement, solar radiation, extraterrestrial insulation,

windows, heating and cooling loads, air exchange, principles of load calculations, storage effects and limits of static analysis, zones, heating loads, CLTD/CLF method for cooling loads, transfer functions for dynamic load calculations.

Prerequisite: ME 309 (Fluid Mechanics)

ME 428 HVAC II (Cr.3, Lc.1, Lb.6)

Design HVAC complete system for a building.

Prerequisite: HVAC I and Instructor's consent.

ME 535 Industrial Design Projects (Cr. 3, Le. 1, La. 6)

Introduction to design theory, project management, team dynamics, and socio-economic context of design, etc.; application of design principles, engineering analysis, and experimental methods to an industrial interdisciplinary design project involving design, analysis, fabrication, and testing.

Prerequisites: ME 335 (Meas & Inst Lab), ME 309 (Fluid Mechanics).

ME 445 Manufacturing Processes III (Cr. 3, Le. 2, La. 3)

Design, fabrication, and testing of various composite and plastic materials. Analysis of mechanical properties of laminated composites. Extrusions, Molding, Lay-up and forming of plastic and composite parts and structures. Students will have the opportunity to design and fabricate various parts from various materials.

Prerequisite: ME 310 (Manufacturing Processes II)

Appendix 2: Kabul University Faculty of Engineering Textbooks

Text Book	Author	ISBN	Publisher
Calculus: Early Transcendentals, 5th Ed.	Stewart, James	9788131501108	Thomson Brooks
Chemistry, 9th Ed (SIE)	Chang, Raymond	0070648190	McGrawHill
Engineering Fundamentals and Problem Solving, 5th Ed	Eide, Jenison, Northrup and Mickelson	9780073191584	McGraw-Hill
An Engineer's Guide to MATLAB, 2nd Ed.	Magrab, et.al.	9780131454996	Pearson Prentice Hall
Text Book	Author	ISBN	
Calculus: Early Transcendentals, 5th Ed.	Stewart, James	9788131501108	Thomson Brooks
Engineering Problem Solving with C++, 2nd Ed.	Etter and Ingber	9780136011750	Pearson Prentice Hall,
An Engineer's Guide to MATLAB, 2nd Ed.	Magrab, et.al.	9780131454996	Pearson Prentice Hall,
Design Drawing	Ching	0-442-01909-2	Wiley
Fundamentals of Physics, Extended, 8th Ed	Halliday, Resnick & Walker	9780471758013	Wiley
Principles and Practices: An Integrated Approach to Engineering Graphics and AutoCAD 2009	Randy Shih	9781585033836	SDC Publications,
Engineering Graphics: Tools for the Mind	Bryan Gaham	9781585034123	SDC Publications,
Text Book	Author	ISBN	
Calculus: Early Transcendentals, 5th Ed.	Stewart, James	9788131501108	Thomson Brooks
Fundamentals of Physics, Extended, 8th Ed	Halliday, Resnick & Walker	9780471758013	Wiley
Thermodynamics: An Engineering Approach, 4th Ed, 2001	Cengel and Boles	9780072383324	McGraw Hill
Vector Mechanics for Engineers, 8th Ed (Si Units), Statics and Dynamics	Johnston & Beer	9780070659940	McGraw Hill
Architecture: Form, Space and Order	Ching	0-471-28616-8	Wiley
Freehand Sketching	Laseau	0-393-73112-X	W.W. Norton
Text Book	Author	ISBN	
Ordinary Differential Equations	Tenenbaum and Pollard	9780486649405	Dover, 1985 paperback
Vector Mechanics for Engineers, 8th Ed (Si Units), Statics and Dynamics	Johnston & Beer	9780070659940	McGraw Hill

Mechanics of Materials, 3rd Ed	Beer, Johnston	9780070535107	McGraw Hill
Fund. of Electric Circuits	Charles Alexander	0070648034	McGraw Hill
Fundamental of Digital Logic with Verilog Design, 2nd Ed	S. Brown	0070667241	McGraw Hill
Design with Models	Mills	0-471-64837-X	Wiley
A Global History of Architecture	Ching	0-471-26892-5	Wiley
Sun, Wind and Light, 2nd Edition	Brown and DeKay	0-471-34877-5	Wiley
Text Book	Author	ISBN	
Engineering Economy, 14th Edition, illustrated	Sullivan, William G, Elin M. Wicks, Patrick Koelling	9780136142973	Prentice Hall
Fundamentals of Structural Analysis, 3rd Edition	Leet, et al	9780073305387	McGraw Hill
Hydrology and Flood Plane Analysis, 4th Ed	Bedient	9780131745896	Prentice Hall
Fundamentals of Fluid Mechanics	Munson, Young, and Okiishi	9780471675822	John Wiley and sons
“Elementary Surveying”, 5th Edition;	Jack McCormac;	9780471237587;	John Wiley
"Practical Manual of Land Development", 4th Ed.	Barbara C. Colley	0071448667;	McGraw Hill hard back;
"Introduction to Google SketchUp", 1st Ed.,	Aidan Chopra,	9780470175651,	John Wiley - paper back.
Linear Algebra for Engineers and Scientists Using Matlab, 1st Ed	Hardy	9780139067280	Prentice Hall
Thermodynamics: An Engineering Approach, 4th Ed, 2001	Cengel and Boles	9780072383324	McGraw Hill
Principles and Applications of Electrical Engineering, 5th Edition	Giorgio Rizzoni	9780073220338	McGraw Hill
Materials and Processes in Manufacturing, 10th Edition	E. Paul DeGarmo, J. T. Black, Ronald A. Kohser	9780470055120	Wiley
Manual accompanying hardware			
Fund. of Electric Circuits	Charles Alexander	0070648034	McGraw Hill
Microelectronics Circuits	Sedra and Smith	97801953338836	Oxford University Press
Electric Machines, 3rd Ed	Kothari and Nagrath	0070583773	McGraw Hill
The Architect’s Studio Companion, 4th edition	Allan and Iano	9780471736226	Wiley
Modern Architecture Since 1900, 3rd edition	Curtis	9780714833569	Phaidon
Building Construction Illustrated	Ching	9780470087817	Wiley
(no textbook)			

Text Book	Author	ISBN	
Principles of Geotechnical Engineering, 6th Ed	Braja M. Das	9780534551445	Cengage Learning
“Design of Concrete Structures”, 14th	Nilson, Darwin, Dolan	9780073293493	McGraw Hill
Water Resource Engineering	Wurbs and James	9780130812933	Prentice Hall
Steel Design, 4th Ed	Segui, William T.	9780495244714	Cengage Learning
“Elementary Surveying”, 5th Edition; "Practical Manual of Land Development", 4th Ed.; "Introduction to Google SketchUp", 1st Ed.,	Jack McCormac; Barbara C. Colley; Aidan Chopra,	9780471237587; 0071448667; 9780470175651,	John Wiley - paper back; McGraw Hill hard back; and John Wiley - paper back.
Kinematics, Dynamics and Design of Machinery, 2nd	Waldron and Kinzel	9780471244172	Wiley
Introduction to Materials Science for Engineers, 7/E	James F. Shackelford	9780136012603	Prentice Hall
Materials and Processes in Manufacturing, 10th Edition	E. Paul DeGarmo, J. T. Black, Ronald A. Kohser	9780470055120	Wiley
Engineering Economic Analysis (W/CD), 10th Ed, Enhanced	Donald G. Newnan, Ted G. Eschenbach, and Jerome P. Lavelle	9780195395181	Oxford University Press
Theory & Design for Mech Measurement, 4th Ed	Figliola, Richard S and Donald E. Beasley	9780471445937	Wiley
Fundamental of Digital Logic with Verilog Design, 2nd Ed	S. Brown	0070667241	McGraw Hill
Linear Systems and Signals, 2nd Ed	B. P. Lathi	9780195158335	Oxford University Press
Microelectronics Circuits, 5th, Revised	Sedra and Smith	9780195338836	Oxford University Press
Electric Machines, 3rd Ed	Kothari and Nagrath	0070583773	McGraw Hill
The Eyes of the Skin, 2nd Edition	Pallasmaa	9780470015780	Wiley
Fundamentals of Building Construction: Materials and Methods	Allen and Iano	9780470074688	Wiley
Mechanical & Electrical Equipment for Buildings, 10th Ed	Stein, et al	9780471465911	Wiley
Architecture of the Islamic World: Its History and Social Meaning	Michell (Editor)	9780500278475	Thames & Hudson
Text Book	Author	ISBN	
“Design of Concrete Structures”, 14th Ed	Nilson, Darwin, Dolan	9780073293493	McGraw Hill

Pavement Analysis and Design, 2/E	Yang H. Huang	9780131424739	Prentice Hall
Water Supply and Pollution Control, 8th Ed	Viessman, Hammer, Perez, and Chadik	9780132337175	Prentice Hall
Construction Planning, Equipment And Methods, 7th Ed	Aviad Shapira, Cliff J.Schexnayder, R.L. Peurifoy	none	www.contractor-books.com
Principles of Highway Engineering and Traffic Analysis, 4th Ed	Mannering, Fred L., Walter P. Kilareski and Scott S. Washburn	9780470290750	Wiley
Essentials of Geology, 10/E	Lutgens, Tarbuck and Tasa	9780136003762	Prentice Hall
Internal Combustion Engines. 2nd ed	Ferguson and Kirkpatrick	9780471356172	Wiley
Fund of Heat & Mass Transfer	Incropera	0471457280	Wiley
Finite Element Analysis: Theory and Application with ANSYS, 3rd	Moaveni	9780131890800	Prentice Hall
Shigley's Mechanical Engineering Design - 8th Ed	Budynas and Nisbett	9780073312606	McGraw Hill
Feedback Control of Dynamic Systems	Franklin, et al	9780131499300	Prentice Hall
Modern Digital and Analog Communication Systems, 3rd Ed	B. P. Lathi	9780195110098	Oxford University Press
Power System Analysis and Design 4th Ed	Glover, Sarma, Overbye	9780534548841	Cengage Learning
Power Electronics: Circuits, Devices, and Applications, 3r Ed	Muhammad Rashid	9780131011403	Prentice-Hall
Feedback Control of Dynamic Systems	Franklin, et al	9780131499300	Prentice Hall
Fundamentals Of Applied Electromagnetics, 5th Ed	F.T. Ulaby	9780132413268	Prentice Hall
Natural Energy and Vernacular Architecture	Fathy, Hassan	0226239187	U of Chicago Press
Mechanical & Electrical Equipment for Buildings, 10th Ed	Stein, et al	9780471465911	Wiley
“Elementary Surveying”, 5th Edition	Jack McCormac	0-13-148189-4	Prentice Hall
House, Form and Culture	Rapoport	0-13-395673-3	Prentice Hall
Text Book	Author	ISBN	
Water Supply and Pollution Control, 8th Ed	Viessman, Hammer, Perez, and Chadik	9780132337175	Prentice Hall

See below			
No Textbook			
The Seismic Design Handbook	Farzad Naeim	9780792373018	Springer
Principles of Foundation Engineering, 6th Ed.	Das, Braja M.	9780495082460	Cengage Learning
HVAC Systems Design Handbook, 4th Edition	Roger W. Haines and Lewis Wilson	9780071395861	McGraw Hill
Handbook of Plastic Processes	Charles A. Harper	9780471662556	Wiley
Project Management: A Systems Approach to Planning, Scheduling, and Controlling, 10th Edition	Harold Kerzner	9780470278703	Wiley
The Mechanical Design Process, 4th Edition	Ullman	9780072975741	McGraw Hill
See below			
A Manual of Construction Documentation	Wiggins, Glenn	9780823030026	Watson-Guptill
Landscape Architecture, 4th Edition	Simonds and Starke	9780071461207	McGraw Hill
Designing Sustainable Cities in the Developing World	Zetter & Watson	9780754643555	Ashgate Publishing
Interior Design Illustrated, 2nd Ed	Ching and Binggeli	9780471473763	Wiley
Steel Design, 4th Ed	Segui, William T.	9780495244714	Cengage Learning
Text Book	Author	ISBN	
Toward a New Regionalism	Miller, David	9780295984940	U of Washington Press
Architectural Regionalism: Collected Writings of Place, Identity, Modernity and Tradition	Canizaro (Editor)	9781568986166	Princeton Architectural Press
Architectural Programming: Information Management Design	Duerk	9780471284680	Wiley
Text Book	Author	ISBN	
Urban Design: A Typology of Procedures & Products	Lang, Jon	9780750666282	Architectural Press, Elsevier
Management of Construction Projects	John Schaufelberger and Len Holm	0130846783	Prentice Hall

Power System Analysis and Design 4th Ed	Glover, Sarma, Overbye	9780534548841	Cengage Learning
ELECTRICAL SYSTEMS DESIGN	BOSELA	9780139754753	Prentice Hall
NATIONAL ELECTRICAL CODE 2008	NFPA	9780877657903	NECCode Books
Modern Digital and Analog Communication Systems	B. P. Lathi	9780195110098	Oxford University Press
(no text book)			
Photovoltaic Systems Engineering, 2nd Ed	Roger A. Messenger and Jerry Ventre	9780849317934	CRC Press, 2004
Wind Energy Explained: Theory, Design and Application	J. F. Manwell, J. G. McGowan, and A. L. Rogers	7980471499725	John Wiley
Micro-Hydro Design Manual: A Guide to Small-Scale Water Power Schemes	Adam Harvey and Andy Brown	1853391034	Development Book Shop, Intermediate Technology Publications
The Micro-Hydro Pelton Turbine Manual: Design, Manufacture and Installation for Small-Scale Hydropower	Jeremy Thake	1853394602	Development Book Shop, Intermediate Technology Publications