



Sohar University
Faculty of Engineering
Civil Engineering
Courses Description- Current Program Matrix
2016-2017

	Course Code & Name	Description
Level 1: Semester 1	MATH1000: Mathematical Foundations	This course covers basic mathematics that will be necessary in any degree or career that involves quantitative skills. The course covers many aspects of analysing functional relationships. Graph sketching is useful in picking trends and modelling economic or physical systems. The course will cover limits and continuity of functions. Carrying on from this, the calculus of derivatives and integrals will be introduced. Any system, which varies with time, requires knowledge of derivatives. Also, the theory of integration is important for differential equations.
	COMP1500: Introduction to Programming	This course will enable you to solve engineering problems, develop computer algorithms, acquire working knowledge of C++ programming and experience some “hands-on” computer lab activities.
	ENGG1013: Engineering Drawing and Computer Drafting	This course will introduce the standards, conventions, techniques and tools of technical graphics so that the students will be able to convey graphically the ideas and information necessary for the construction or analysis of machines, structures and systems. In addition Computer Aided Drafting is also covered and practiced using AutoCAD.
	CHEM1020: General Chemistry	General Chemistry deals with the Properties of gases, solids, & solutions, phase changes, Thermochemistry, Equilibria with applications to acid – base chemistry & to solubility of salts, Electrochemistry and kinetics. This course will introduce the students the fundamental concepts about various states of matter. It will enhance their knowledge on mass and energy conversion .In general terms the course is aimed to make the student understand the basic principles of chemistry.
	UNIR1000: Communication Skills	This course is designed to provide students with those skills required to communicate effectively and efficiently at their future work place and increase their career prospects. Being directed towards the work environment, the course intends not just to familiarize students with the functional language they will need to employ in their future jobs, but also to build up their confidence in communicating in English and increase their fluency. Also the course will enlarge students’ knowledge of the business world.



	Course Code & Name	Description
Level 1: Semester 2	ENGG1023: Engineering Materials	This introductory course involves the development of the following concepts: Types of Materials- Metals, ceramics, and polymeric materials. Bonding between atoms-The characteristics of atoms, atomic structure, bonding and inter-atomic forces. Describe quantitatively and qualitatively the structure of SC, FCC, BCC and HCP crystals. The microstructure and Properties– the way in which large groups of atoms are arranged in a solid on the microscopic scale – governs many of the properties of a material; Processing-Structure-Properties-Performance. Determine the mechanical properties of a material from its stress-strain diagram. Determine steady state and transient diffusion profiles. Determine the equilibrium phase structures in binary alloys. Describe techniques to prevent corrosion in metal.
	ENGG1010: Applied Mechanics	Mechanics refers to the branch of science that studies the way in which forces affect bodies either at rest or in motion. Engineers are concerned with the way that mechanics can be applied so that they can determine how objects will react to forces that are applied to them. This allows the engineer to ensure that an object under a given load will serve its intended purpose. Thus the title of this course, Applied Mechanics. Engineering students learn how to analyze and predict the behaviour of physical systems in this course. This course comprises two major sections - Statics and Dynamics. Statics is the study of objects in a state of force equilibrium and dynamics is the study of objects in motion. While this course leads to skills that an engineer can directly apply to basic analysis and design, applied mechanics also forms the basis for more advanced courses taken by students during their studies. These range from structural analysis, advanced dynamics, fluid and particle mechanics through to engineering acoustics.
	ELEC1100: Principles of Electrical Circuits	The course provides the necessary skills in the analysis and design of electrical and electronic circuit and components which are fundamental to the study of electrical systems, electronics, computer systems and communications systems. The course covers the fundamental parameters of electrical system such as voltage, current, power, energy, resistance, capacitance, and inductance. DC circuit analysis theorems such as Ohms law, Kirchhoff's laws, node analysis, Mesh analysis, Thevenin's theorem, Norton's theorem are covered. The concept of AC circuit including sinusoidal waveform interpretation and the basic RLC circuit analysis also covered.
	MATH1100: Calculus & Linear Algebra	The course provides an exposition of appropriate results in the study of basic differential equations, basic linear algebra, and vector calculus with emphasis on methods and techniques that have proved relevant in a wide variety of applications. Students should gain knowledge of various mathematical tools and be able to apply these tools to problems from various sources.
	UNIR1001: Oman & Islamic Culture	The course provides introduction to Islamic Culture, its importance, resources and characteristics, Islamic culture and contemporary events, Omanis role in spreading Islam and building Islamic civilisation.



	Course Code & Name	Description
Level 2: Semester 1	CIVE2310 Strength of Materials	Relationships between stress and strain in deformable solids are studied. Analysis is applied to axially-loaded members, circular shafts, beams and columns. Combined stresses, statically indeterminate Systems and properties of structural materials are included. Stress and strain analysis, principal stresses/strains, Mohr's Circle and combined loading. Thin/thick wall cylinder analysis, torsion, power transmitting, beam bending, transfer shear and buckling in beam are also covered.
	CIVE2610 Introduction to Civil Engineering and Environmental Issues	Introduce the students to the practice of civil engineering, civil engineering design, ethics, communication skills, team working skills, civil engineering drawing and career planning. Also introduce the students to environmental issues & management. Population & urbanization issues, air, water & noise pollution. Project-based investigation of issues. Monitoring & assessment of environmental data.
	CIVE2710 Surveying	The students will learn how to make distance measurement, levelling, angle and direction measurement. They also will be introduced to control traverse, setting out, earthwork computation and horizontal and vertical curves
	MATH2100: Calculus & Statistics	This course deals with statistics and probability for engineers. The following topics are covered: data representation, mean, median, range, mode and standard deviation. Probability topics include experiments, outcomes, events, permutations and combinations, Random variables, probability distributions, median and standard deviation as well as the normal, binomial, and hyper-geometric distributions. The second part involves series, arithmetic series and geometric series and their applications. The third part covers the application of Laplace Transforms to solve differential equations and systems of differential equations with constant coefficients. In particular, the following are to be introduced in this part: Laplace transform definition, Inverse Laplace Transform, linearity, shifting, Transforms of derivatives and integrals, differential equations, Unit step function, second shifting theorem, Dirac's Delta function, Differentiation and integration of transforms, Convolution and integral equations. In the final part of the course, the three main types of linear partial differential equations (PDEs) are introduced in the context of applications to vibrations of a stretched string, steady and unsteady diffusion. Fourier's method of separation variables and superposition is presented in this context, including an introduction to Fourier Series.
	UNIR2001A B Entrepreneurship A and B	



	Course Code & Name	Description
Level 2: Semester 2	CIVE2120 Fundamental of Fluid Mechanics	The course covers the following topics: Introduction and basic fluid properties. Fluids statics, pressure measurements Fluid Kinematics, application of conservation laws, continuity, momentum & energy balances. Bernoulli equation, flow measurement. Viscous flow in Pipe, pumps. External flow. Dimensional Analysis
	CIVE2210 Fundamentals of Engineering Geology and Soil Mechanics	The course introduces the fundamentals of geology in the practice of civil engineering as well as the application of laws of mechanics to study the behavior of soil to be used as engineering material. Also includes identification, classification and description of soil for engineering purposes. Phase relationship, compaction, flow of water through soil, permeability, seepage, stresses, concept of shear strength, parameters, Coulomb's law, shear strength of cohesive and non-cohesive soils, factors affecting shear strength of soil and its applications in engineering , are also covered in this course. The coursework also includes the laboratory work of performing experiments related to basic physical properties of soil, compaction and permeability.
	CIVE2320 Introduction to Structural Analysis and Design	This course will emphasize on developing students ability to analyze a structure and to provide a realistic applications encountered in professional practice. the students taking this course will be introduce to elementary structural analysis techniques, analysis of statically determinate beams, trusses, frames, Structural Loading, Structural instability, influence lines, deflections by moment areal method and conjugate beams and computer software for structural analysis. The students will also be introduced to the principles of structural design
	UNIR2000: Organisational Communications	The purpose of the course is to equip students with the necessary skills/tools that are required in communicating within an organisation. It focuses on understanding the various types of communication that organisations use and ways in which to make and create effective communication.
	UNIR1002: Arabic Language Skills	It involves simple definition about Arabic language branches and skills (speaking, reading, writing) in addition to the fundamental rules that help mastering these skills.



	Course Code & Name	Description
Level 3: Semester 1	CIVE3340 Structural Analysis	This course will introduce the students to the analyses of indeterminate structures. The course contentment includes, Principle of Virtual Work and Reciprocal Principles, Analysis of Indeterminate Structures, Energy Methods, Slope Deflection Method, Moment Distribution Method, Introduction to matrix Methods, Plastic Analysis of Structure, Analysis by using Software Programming
	CIVE3110 Hydrology	Hydrology is the study of the distribution and fate of water. Water is essential for life and drought and famine are the disastrous consequences of having a less than expected supply of water. Conversely, too much water can cause havoc in the form of floods. Scientists and engineers are continually trying to improve our understanding the processes that distribute water and how we can better anticipate water flows from catchments, especially the extremes of low and high flows. The course content includes Catchment processes including precipitation, evapo-transpiration, infiltration & runoff; generation of flows from catchments; statistical analysis of hydrological data; behavior of flows in channels. Principles of open channel flow, uniform flow, rapidly varied flow and gradually varied flow.
	CIVE3360 Structural Steel Design	This course introduces the students to steel structures, layout of steel structures, calculation of loads and forces in steel members, steel material properties, steel cross-section properties, design of steel tension members, design of steel compression members, design of laterally unrestrained and restrained steel beams, design of steel base plates, design of steel members subjected to combined axial and flexural loads and design of steel connections. Students are also introduced to the use of British Standards BS5950 for steel structures..
	ENGG3700: Numerical Analysis	This introductory course in numerical analysis provides the Knowledge and methods required to solve numerically, practical mathematical problems frequently encountered in engineering applications. This course include Mathematical modelling & error analysis, programming with MATLAB, root finding, solving of linear algebraic equations, curve fitting, performing numerical integration and differentiation and solving ordinary differential equations.



	Course Code & Name	Description
Level 3: Semester 2	CIVE3350 Design of Reinforced Concrete Structures	Introduce the students to structures and loading systems, reinforced concrete theory for flexure, shear, and compression; strength & serviceability limit states. Design of solid slabs and beams. Design of columns and staircase. Code provisions and detailing.
	CIVE3410 Traffic and Transportation Engineering	This course introduces students to the field of transportation and traffic engineering. It emphasizes on the need for good planning, design and operation of transport facilities in order to improve their safety, efficiency, cost effectiveness and minimize their adverse impacts. This course deals primarily with road transport systems and the traffic analysis process. Topics include the basic traffic flow theories, traffic management and operations and the travel demand forecasting.
	CIVE3220 Geotechnical Engineering	This course develops fundamental soil mechanics theory and its application to geotechnical analysis and design. Topics covered include stress distribution in soils, Boussinq's method (elastic theory), compressibility and consolidation of soils, one-dimensional consolidation theory and characteristics, consolidation tests, estimation of the magnitude and rate of consolidation settlement. Shear strength of soils and Mohr circles, shear strength characteristics, types of shear strength tests, residual shear strength. Slope stability, modes of slope failure, analysis of infinite slope. Also an introduction into types of soil foundations, shallow foundation, foundation machineries, site investigation bearing capacity and geotechnical design of shallow foundation will be conducted. The course also includes the performance of experiments to delineate the shear strength, consolidation properties and field exploration
	UNIR3000: Research Methodology	The purpose of the course is to equip students with the necessary writing and language skills required to undertake an independent research project. It focuses on developing academic writing skills and understanding the various steps in the research process. This will include an introduction to the research process, reviewing and analysing sources, incorporating sources, and applying correct academic format.



	Course Code & Name	Description
Level 4: Semester 1	CIVIL4511 Civil Engineering Design	In this course, students are required to work in groups to undertake a complete design work on a given civil engineering project and to submit some reports to show the project design progressing. Seminars and briefing regarding good professional practice will be conducted to enhance the students' capabilities and performance.
	CIVIL4810 Project Management	This course introduces the students to the basic skill and knowledge of managing civil engineering project. Elements of conceptual planning, tendering, types of contract, law of contract, contract dispute resolving techniques and project closeouts will also be thought. The students will also be introduced to cost estimation, time and cost control during project execution, scheduling the activities and resource leveling. Computer aided solutions for scheduling of project will also be introduced.
	CIVIL4130 Water Resources Engineering	This course will introduce the students to the design of a water treatment plant, a water supply system, an urban drainage system and irrigation systems. The students will also have an overview of the water resources situation in Oman and will be introduced to water resources development.
	ENGG4801 Thesis Project	The purpose of ENGG4801 is to develop the student's research and problem solving skills. The course involves the specification, development and evaluation of an individual research project on a specific topic or problem within the broad fields of engineering streams. The student is expected to systematically plan and manage the project, and to clearly present the work and its contribution in context of the current literature and prior art.



	Course Code & Name	Description
Level 4: Semester 2	ENGG4400 Renewable Energy & Energy Management	Introduction to energy systems with emphasis on sustainability, renewable and non renewable sources and energy management.
	CHEM4012 Industrial Wastewater & Solid Waste Management	The aim of this course is to review current practices in the wastewater and solid waste management industries and to introduce the most advanced methods and technologies for characterization, treatment and disposal of liquid and solid wastes.
	CIVIL4320 Transportation Engineering	This course introduces students to the field of transportation and traffic engineering. It emphasises on the need for good planning, design and operation of transport facilities in order to improve their safety, efficiency, cost effectiveness and minimize their adverse impacts. This course deals primarily with road transport systems and the traffic analysis process. Topics include the basic traffic flow theories, traffic management and operations and the travel demand forecasting. Students are also introduced to the pavement bituminous materials and properties, design of flexible and rigid pavements, highway capacity analysis and level of service, the geometric design of highway. The importance of road safety and the impact of advanced technologies (Intelligent Transport Systems - ITS) on the transportation planning and management are also discussed.
	ENGG4801 Thesis Project	The purpose of ENGG4801 is to develop the student's research and problem solving skills. The course involves the specification, development and evaluation of an individual research project on a specific topic or problem within the broad fields of engineering streams. The student is expected to systematically plan and manage the project, and to clearly present the work and its contribution in context of the current literature and prior art.