



**جامعة فلسطين**

**University of Palestine**

**Description of Courses for the Program of .....**





2	<b>Course name:</b>	<i>Introduction to Engineering</i>	
1.	<b>Course name:</b>	<b><i>Physics I Lab</i></b>	
	<b>Course type:</b>	<b>College requirement</b>	
	<b>Course number:</b>	BENG 1105	<b>Credits number:</b> 1
Course Description	<p>In this lab course, students perform experiments illustrating the principles learned in Physics I (BENG 1303). The purpose of the physics laboratory is to allow students to witness the concepts and physical laws that are introduced in experimental theories. You will also be exposed to elementary laboratory techniques. Every class will have a short lecture introducing the procedures, concepts, formulas and instructions relevant to the experiment. The lecture will also cover what is expected in lab-report. Experiments will usually be performed in groups, but each student will turn in an individual lab report.</p> <p>Teaching of the course deals with the following topics:  Measuring Tools, Simple Pendulum, Hooks law, Force Table, Projectile motion, Viscosity, Friction, <b>Archimedes, Boyle's Law, air table.</b></p>		
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• Fundamental, functional laboratory skill sets necessary to solve problems that they may encounter in Engineering Physics-related work place.</li> <li>• Contribution to a development of students' practical skills</li> <li>• Great emphasis is placed on developing student's learning skills using experimental tools in physics labs.</li> <li>• Learn how to effectively work in a team environment when solving Engineering Physics related problems.</li> <li>• Interpret the results of simple experiments and demonstrations of physical principles.</li> <li>• Prepare a lab report according to accepted norms.</li> <li>• Apply experimental methodology to investigate physical phenomena.</li> </ul>		
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Integrate the scientific method into problem-solving and experimentation.</li> <li>• Develop good experimental technique, including proper setup and care of equipment, conducting experiments, obtaining and analyzing results in order to observe physical phenomena, assess experimental uncertainty, make meaningful comparisons between experiment and theory, and report verbally and in written language the results of the experiment.</li> <li>• Demonstrate basic communication skills by working in groups on laboratory experiments and the thoughtful discussion and interpretation of data.</li> </ul>		
	<b>Course type:</b>	<b>College requirement</b>	

	<b>Course number:</b> BENG 1107	<b>Credits number:</b> 1
<b>Course Description</b>	<p>This course introduces students to the engineering profession tackling a variety of relevant topics. The course provides an introduction to the profession's ethics. It , including the disciplines of chemical, civil, computer, electrical, environmental, and mechanical engineering; Prepares students for success through the integration of the following important skills: technical problem solving and engineering design, ethical decision-making, teamwork, and communicating to diverse audiences.</p> <p><b>Teaching of the course deals with the following topics:</b></p> <ul style="list-style-type: none"> <li>Concept and evolution of Engineering and Urban Planning</li> <li>Engineering profession , scope and ethics</li> <li>How to be a good engineer/planner</li> <li>Broadening vision for Engineering students</li> <li>Engineering and planning education</li> <li>Architecture and Planning Engineering</li> <li>Civil Engineering – Environmental Engineering-Software Engineering, Biomedical Engineering.</li> </ul>	
<b>Course Objectives</b>	<p><b>The course aims to achieve the following:</b></p> <p>This course aims at encouraging students to explore engineering and urban planning and understand the themes of this science and profession. Furthermore, it aims to help the junior students to understand the following :</p> <ul style="list-style-type: none"> <li>• The profession’s ethics.</li> <li>• History of Engineering and Urban Planning,</li> <li>• How to be a good engineer/planner,</li> <li>• Engineering and planning concepts,</li> <li>• How to study Engineering and Urban Planning,</li> <li>• General knowledge about global engineering and planning landmarks and development.</li> </ul>	
<b>Learning Outcomes of</b>	<p><b>At the end of the course the student will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Students will become familiar with the University, the College of engineering and the various</li> </ol>	

the Course	<p>departments within the college.</p> <p>2. How to be successful in work and life in general.</p> <p>3. How to work in a team-based project with report and presentation.</p> <p>4. The understanding of professional, ethical, legal, security and social issues and responsibilities.</p> <p>5. How to work in a team-based project with report and presentation.</p> <p>6. Students will gain an awareness of the connections between engineering and the wider world. Lectures on the history and future of engineering will tie the relevance of engineering to global societal issues.</p>
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3.	<b>Course name:</b>		<i>Engineering Terminology</i>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	BENG 1211	<b>Credits number:</b>	2

Course Description	<p>This course is particularly designed to enhance students with the required foundation to undertake further engineering courses. It will cover basic terminologies required for Civil, Architecture, Software and Biomedical Engineering.</p> <p>Teaching of the course deals with the following topics:</p> <p>Engineering Drawings, Civil engineering categories + Project life cycle, Terminologies related to planning and finance, Health safety + Quality management, Hydrology + Soil Mechanics + Fluid Mechanics, Biomedical Engineering, Biomedical Engineering, Urban Planning, Interior Design &amp; Space Planning, Software Engineering.</p>
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Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• Equip students with professional Engineering terminologies.</li> <li>• Enhance overall communication skills in English.</li> </ul>
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Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Identify basic technical terminologies related to different engineering disciplines.</li> <li>• Demonstrate the ability to use engineering terminologies in the right context.</li> <li>• Student will demonstrate the ability to produce a presentation in technical English.</li> </ul>
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4.	<b>Course name:</b>	<i>Calculus I</i>
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	<b>Course type:</b>	<b>College requirement</b>	
	<b>Course number:</b>	BENG 1301	<b>Credits number:</b> 3
<b>Course Description</b>	<p>Teaching of the course deals with the following topics:</p> <p>Sets and number sets, priority of mathematical operations, solving equations, solving inequalities.</p> <p>Function and their graphs, shifting and scaling function, special functions: polynomials, trigonometric and exponentials.</p> <p>Rates of change and tangents to curves, limits and limit laws, the precise definition of a limit. One sided limits Continuity, Limits involving infinity.</p> <p>Tangents and derivative at a point, the derivative as a function, differentiation Rules. The derivative as a Rate of change, derivatives of Trigonometric function. The chain Rule, Implicit differentiation, Extremums and special points. The mean value theorem, Monotonic functions and first derivative test. The mean value theorem, Monotonic functions and first derivative test.</p> <p>Integration by substitution and definite integrals, Area between curves, volume of revolution, Arc length.</p>		
<b>Course Objectives</b>	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>- Understand and use various mathematical rules and principles</li> <li>- Understand and use real functions and their properties in various disciplines within Engineering studies.</li> <li>- Understand and use differentiation and integration in various fields in Engineering discipline.</li> </ul>		
<b>Learning Outcomes of the Course</b>	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>- Equip students with different methods and techniques in calculations.</li> <li>- Familiarize students with real function and their rules in science.</li> <li>- Give students a strong background in differentiation and integration, alongwith their applications in Science and Engineering.</li> </ul>		

5.	<b>Course name:</b>	<b>Physics I</b>	
	<b>Course type:</b>	<b>College requirement</b>	
	<b>Course number:</b>	BENG 1303	<b>Credits number:</b> 3
<b>Course Description</b>	<p>Teaching of the course deals with the following topics:</p> <p>Units, Measurement, and Dimensional Analysis.</p>		

	<p>Vectors and Coordinate Systems.</p> <p>Motion in One Dimension, Freely Falling Object, gravity, and Relative Velocity. Motion in Two Dimensions and Projectile Motion.</p> <p>Newton's Laws of Motion &amp; The fundamental forces in mechanics.</p> <p>Work done by a Force, &amp; Power.</p> <p>Kinetic and potential Energy, and Conservation of Energy.</p> <p>Linear Momentum and Impulse of a Force.</p> <p>Types of Collisions in One Dimension, and in Two Dimension.</p>
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• <i>Understanding and demonstrating the basic principles and concepts of mechanics theories with easy and clear way.</i></li> <li>• <i>Bridging the gap between school and university physics by providing a more complete and logical framework in key areas of classical physics.</i></li> <li>• <i>Providing fundamental knowledge of physics and its important in engineering professions.</i> <ul style="list-style-type: none"> <li>• <i>This course will form the base for further engineering courses.</i></li> </ul> </li> </ul>
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• <i>Know and correctly use the language of physics (naming, terminology, and symbolic).</i></li> <li>• <i>Demonstrate an understanding of the basic principles, theories, and laws of physics through the description of physical systems</i></li> <li>• <i>Understanding the importance of physics and its applications in different fields of engineering.</i></li> <li>• <i>Understand and apply physical concepts, facts, and models, and use them as a foundation to further study.</i></li> </ul>

6.	<b>Course name:</b>	<i>Engineering Drawing</i>
	<b>Course type:</b>	<b>College requirement</b>

	<b>Course number:</b>	BENG 1309	<b>Credits number:</b>	<b>3</b>
<b>Course Description</b>	<p>This course is an introduction to the students about the basic and standard for drawing technique. The drawing technique is emphasized in how to draw an object graphically, to study multi-view, pictorial drawings and to sketch, geometric construction, sectioning, lettering, dimensioning and auxiliary projections. The course presents theories and principles of orthographic projection. Studies the analysis and graphic presentation of space relationships of fundamental geometric elements: points, lines, planes and solids</p> <p>Teaching of the course deals with the following topics:</p> <p>Introduction, Drawing Instruments, Planning your engineering drawing, Applied Geometry Line Styles , Arcs , Circles, polygons..etc, Dimensioning, Layout of Engineering Drawing, Engineering Drawing - Projections. Orthographic or Multi-view Drawing, Isometric Drawing, Assembly Drawing, Third view projection, Missing lines, Sectioning.</p>			
<b>Course Objectives</b>	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• An understanding of how graphical methods can be used to communicate information about engineering products.</li> <li>• The importance of course as a step for anyone thinking of taking up a career in engineering</li> <li>• How to produce engineering drawings of different components, assemblies using a variety of sketching and drawing techniques.</li> <li>• Student's visualization skills.</li> </ul>			
<b>Learning Outcomes of the Course</b>	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Identify and use the basic tools of engineering drawing</li> <li>• Sketch engineering components (lines, arches, polygons, isometries....etc.)</li> <li>• Interpret engineering drawings that comply with drawing standards</li> <li>• Understand the theory of projection.</li> <li>• Produce engineering drawings</li> <li>• Develop adequate visualization skills.</li> <li>• Be able to prepare a basic layout</li> </ul>			

7	<b>Course name:</b>	مهارات حاسوب
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	<b>Course type:</b>	<b>University Req.</b>		
	<b>Course number:</b>	<b>UNI 1105</b>	<b>Credits number:</b>	
Course Description	Teaching of the course deals with the following topics:			
Course Objectives	The course aims to achieve the following: - -			
Learning Outcomes of the Course	At the end of the course the student will be able to: - -			

8	<b>Course name:</b>	<b>تيكيت</b>		
	<b>Course type:</b>	<b>University Req.</b>		
	<b>Course number:</b>	<b>UNI 1111</b>	<b>Credits number:</b>	<b>1</b>
Course Description	Teaching of the course deals with the following topics:			
Course Objectives	The course aims to achieve the following: - -			
Learning Outcomes of the Course	At the end of the course the student will be able to: - -			

9	<b>Course name:</b>		دراسات اسلامية	
	<b>Course type:</b>		University Req.	
	<b>Course number:</b>	<b>UNI 1301</b>	<b>Credits number:</b>	<b>3</b>
Course Description	Teaching of the course deals with the following topics:			
Course Objectives	The course aims to achieve the following: - -			
Learning Outcomes of the Course	At the end of the course the student will be able to: - -			

1	<b>Course name:</b>		<i>Calculus II</i>	
	<b>Course type:</b>		College requirement	
	<b>Course number:</b>	BENG 1302	<b>Credits number:</b>	<b>3</b>
Course Description	Teaching of the course deals with the following topics: - One-to-one function -Inverse function and their Derivative - Properties of Natural Logarithms, Derivatives and integration - Integrals of $\tan x$ and $\cot x$ - Properties of Exponential Function, Derivatives and integration - Relative Rates of Growth - L'Hôpital's Rule and applications - Inverse Trigonometric Functions, and Hyperbolic Functions. - Techniques of Integral: Basic Formulas, By part, Partial Fractions, Trigonometric Substitutions. Improper Integrals (D.T, D.C.T, L.C.T)			

	<ul style="list-style-type: none"> <li>- Sequence: Limits, convergence and divergence,</li> <li>- Infinite Series, Properties of: Geometric Series- Telescoping Series Series convergence and divergence by (D.T, D.C.T, L.C.T).</li> </ul>
<b>Course Objectives</b>	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>- To help students develop skills and knowledge of standard concepts in differential calculus.</li> <li>- To help students develop skills and knowledge of standard concepts in integral calculus</li> <li>- To help students develop skills and knowledge dealing with sequances and infinite series</li> </ul>
<b>Learning Outcomes of the Course</b>	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>- Compute integrals, using appropriate methods</li> <li>- Recognize and evaluate improper integrals</li> <li>- Recognize a geometric series and correctly apply the convergence theorem.</li> <li>- Be able to apply convergence tests (comparison, ratio, root, alternating series test).</li> </ul>

2.	<b>Course name:</b>		<i>Physics II Lab</i>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	BENG 1106	<b>Credits number:</b>	<b>1</b>
<b>Course Description</b>	<p>Teaching of the course deals with the following topics:</p> <p>Practical-based introduction to electrical concepts. Topics include standard systems and units with basic measurement devices and tools, DC and AC circuits, Electric Charge, Electric Current, Electric voltage, Electric resistor, Ohm's Law, Parallel and series connection, Wheatstone bridge, Kirchoff's Law, Capacitors and capacitors in series and parallel, AC Signals, and Oscilloscope, also based on the some of the features of Resonance circuits such as RC, RL and RLC circuits.</p>			
<b>Course Objectives</b>	<p>The course aims to achieve the following:</p> <ol style="list-style-type: none"> <li>1. Provide and acquire students the skills of dealing with scientific equipment and devices.</li> <li>2. Help students to measure the electrical elements values and quantities and analyze electrical circ</li> <li>3. Equip students with the laboratory experiments.</li> <li>4. Employ practical side; to support the theoretical part and linked together.</li> <li>5. Teach student the chart data and extract and analyze the data from it.</li> <li>6. Enhance the skills of writing good scientific reports.</li> </ol>			
<b>Learning</b>	<p>At the end of the course the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Define skills of using scientific equipment and devices.</li> </ol>			

Outcomes of the Course	2. The ability to measure the electrical elements and quantities and analyze electrical circuits. 3. Perform the laboratory experiments to study and understand the basic concepts of Electrical phenomena DC & Ac waves, Electrical elements, and Electrical circuit analysis and simplification. 4. Employ practical side; to support the theoretical part and linked together; which helps the student to understand and accommodate the physical facts and theoretical concepts. 5. Ability to express chart data and extract and analyze the data from it. 6. The ability to prepare scientific reports.			
3.	<b>Course name:</b>		<i>Physics II</i>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	BENG 1304	<b>Credits number:</b>	<b>3</b>
Course Description	Teaching of the course deals with the following topics: <ul style="list-style-type: none"> <li>• Coulomb's law.</li> <li>• The electrostatic field.</li> <li>• Flux and Gauss's Law.</li> <li>• The potential difference.</li> <li>• Capacitance and dielectrics.</li> <li>• Current and Power.</li> <li>• Electromotive force.</li> <li>• Resistance and resistors.</li> <li>• Ohm's law and Direct current circuits.</li> <li>• Kirchhoff's laws.</li> </ul>			
Course Objectives	The course aims to achieve the following: <ul style="list-style-type: none"> <li>• Understanding and demonstration the basic concepts of electrostatic theories with easy and clear way.</li> <li>• Applying those principles in problem solving.</li> <li>• Providing a good understanding of the way electrical circuits work.</li> <li>• Providing a clear description of the basic concepts of electricity which will form the base for farther engineering courses</li> </ul>			
Learning Outcomes of the Course	At the end of the course the student will be able to: <ul style="list-style-type: none"> <li>• Know and correctly use the language of physics.II (naming, terminology, and symbolic).</li> <li>• Demonstrate an understanding of the basic principles, theories, and laws of physics.II</li> <li>• Understanding the importance of physics and its applications in different fields of engineering.</li> <li>• Understand and apply physical concepts, facts, and models, and use them as a foundation to further study.</li> </ul>			

4.	<b>Course name:</b>		<b>Engineering Chemistry</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	BENG 1308	<b>Credits number:</b>	<b>3</b>
<b>Course Description</b>	<p>Teaching of the course deals with the following topics:</p> <p>Engineering Chemistry designed to provide a survey of inorganic and physical chemistry.</p> <p><b>Topics studied in this course include:</b></p> <p>An introduction to the fundamental principles of chemistry, atomic structure, covalent and ionic bonding, chemical reactions, chemical stoichiometry, chemical bonding acid, base and solution chemistry, and thermochemistry., including; the properties of gases, liquids, and solids; gas law, solutions; atomic and molecular structure; and a discussion of the chemical properties of selected elements. Skills are developed and used where appropriate to enhance the understanding of these concepts.</p>			
<b>Course Objectives</b>	<p>The course aims to achieve the following:</p> <ol style="list-style-type: none"> <li>1. Apply significant figures rules in all calculations providing the correct number of significant figures and units.</li> <li>2. Name elements, provide their symbols and determine the number of protons, neutrons, electrons and nuclei in elements and compounds.</li> <li>3. Calculate percent composition given a molecular formula and molecular formula given the percent composition.</li> <li>4. Identify weak and strong acids and bases and insoluble compounds using dissociation and solubility rules.</li> <li>5. Identify redox reactions including identifying the oxidation, reduction, oxidation agent and reducing agent.</li> <li>6. Calculate oxidation numbers and balance redox reactions.</li> <li>7. Perform stoichiometry calculations for chemical and non-chemical systems whether the limiting reactant is known or unknown.</li> <li>8. Calculate molarity of a solution starting with pure solute or with a concentrated solution as well</li> </ol>			

	<p>as explain how to prepare a solution of a given molarity.</p> <p>9. Convert between wavelength, energy and frequency for light.</p> <p>10. Define what each quantum number represents and how to obtain quantum numbers for any electron in an atom.</p>
<p><b>Learning Outcomes of the Course</b></p>	<p>At the end of the course the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Be able to know how the atoms are arranged in molecules and ions</li> <li>2. Be able to name chemical compounds</li> <li>3. Be able to balance chemical equations and use variety of problems</li> <li>4. Be able to know properties of solution</li> <li>5. Be able to know Energy changes with reactions</li> <li>6. Be able to describe the electronic structure of atoms</li> <li>7. Be able to know the properties of elements in the periodic table</li> <li>8. Be able to differentiate between types of bonds</li> <li>9. Be able to determine molecular shapes of molecules</li> <li>10. Knowledge of properties and behavior of Gases</li> </ol>

5.	<b>Course name:</b>		<i>Probability and Statistics</i>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	BENG 1310	<b>Credits number:</b>	3

<p><b>Course Description</b></p>	<p>Teaching of the course deals with the following topics:</p> <p>Introduction, summarized and graphing data.</p> <p>Describe, explore and compare data.</p> <p>Measures of the center</p> <p>Measures of Variation</p> <p>Fundamentals of Probability</p> <p>The addition rule of probability</p>
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	<p>Multiplication rule: Complements and Conditional Probability</p> <p>Discrete probability distributions, Binomial “discrete” probability distribution</p> <p>Poisson “discrete” probability distribution</p> <p>Continuous probability distributions. The uniform Distribution</p> <p>The standard normal distribution</p> <p>Correlation and Regression.</p>
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• Explore the theoretical basis and practical applications of probabilistic and statistical science</li> <li>• Define statistical concepts and statistical methods.</li> <li>• Train students in thinking and analyzing problems from a probabilistic and statistical point of view.</li> <li>• Instill the belief that Statistics is important for scientific research</li> </ul>
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Explain clearly concepts from probability and statistics.</li> <li>• Apply fundamental concepts in exploratory data analysis.</li> <li>• Appreciate the importance of statistical data and sources.</li> <li>• Understand statistical indicators and how to interpret them.</li> <li>• Collect data in an appropriate manner.</li> <li>• Present data using various graphical methods.</li> <li>• Apply statistical and computational methods to a range of problems in science and engineering involving probability and statistics.</li> </ul>

6.	<b>Course name:</b>		مهارات الإسعاف والطوارئ	
	<b>Course type:</b>		<b>University Req.</b>	
	<b>Course number:</b>	<b>UNI 1110</b>	<b>Credits number:</b>	<b>1</b>
Course Description	Teaching of the course deals with the following topics:			

Course Objectives	The course aims to achieve the following: - -
Learning Outcomes of the Course	At the end of the course the student will be able to: - -

7.	<b>Course name:</b>		لغة إنجليزية	
	<b>Course type:</b>		University Req.	
	<b>Course number:</b>	<b>UNI 1311</b>	<b>Credits number:</b>	<b>3</b>
Course Description	Teaching of the course deals with the following topics:			
Course Objectives	The course aims to achieve the following: - -			
Learning Outcomes of the Course	At the end of the course the student will be able to: - -			





2.	<b>Course name:</b>	<b>Material Science</b>		
	<b>Course type:</b>	<b>College requirement</b>		
	<b>Course number:</b>	<b>BENG 2213</b>	<b>Credits number:</b>	<b>3</b>
Course Description	Teaching of the course deals with the following topics: Material science is an informative two credit course. Thus this course describes atoms, their bonding and their aggregates and also introduces physical phases, their physical differences, and their possible transformations. This course introduces the nature of mechanical properties of solids and reasons these properties back to the nature of the constituent atoms, their bonding and their aggregates.			
Course Objectives	The course aims to achieve the following: <ul style="list-style-type: none"><li>•Introduce fundamental concepts in materials science and engineering</li><li>•Providing fundamental knowledge of physics, mechanic and chemistry, optical and thermal of materials.</li><li>•Understanding and demonstrating the link between the microstructure and the macro-behavior of the materials.</li></ul> -			

<p>Learning Outcomes of the Course</p>	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Understand how structure dictates properties</li> <li>• The use materials properly</li> <li>• Understand how processing can change structure</li> <li>• The realization of new design opportunities with materials...</li> <li>• Differentiate between crystalline and amorphous solids.</li> <li>• Learn about defects in crystals.</li> <li>• Understand physical phases and their corresponding transformations.</li> <li>• Learn effects of heat and pressure on matter</li> </ul>			
<p>3.</p>	<p><b>Course name:</b></p>		<p><b>Advanced Mathematics</b></p>	
	<p><b>Course type:</b></p>		<p><b>College requirement</b></p>	
	<p><b>Course number:</b></p>	<p><b>BCVL 2301</b></p>	<p><b>Credits number:</b></p>	
<p>Course Description</p>	<p>Teaching of the course deals with the following topics:</p> <ul style="list-style-type: none"> <li>- Methods to solve first order normal differential equations (DE's) and employ them in practical applications.</li> <li>- Methods to solve homogeneous and nonhomogeneous higher order DE's</li> <li>- Algebraic method of solving the boundary value problems (VBP) as by applying Laplace and its inverse transformations.</li> <li>- Methods to solve system of linear DE's, by applying basics of linear algebra (matrices and determinants)</li> </ul>			
<p>Course Objectives</p>	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>- Understand functions of several variables.</li> <li>- Learn how to solve many different types of first order DE's.</li> </ul>			

	<ul style="list-style-type: none"> <li>- Learn how to solve DE's of a higher order than 1.</li> <li>- Apply Laplace transformation for BVP.</li> <li>- Learn some basics of linear algebra and apply their knowledge to solve systems of linear differential equations.</li> <li>-</li> </ul>
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>- Deal with functions of several variables.</li> <li>- solve first order DE's, as well as higher order DE's.</li> <li>- apply and use Laplace transformations within BVP.</li> <li>- solve system of linear DE's of any order.</li> </ul>

3.	<b>Course name:</b>		<b>Engineering Statics</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BARE2301,ENGI 2313,BEQP 2311</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>This course presents the theories and applications of basic engineering mechanics, including vectors, Free-body diagram, the computation of resultant forces, 2D and 3D equilibrium of particles and rigid bodies, Moment of a force about a point and an axis, internal forces: normal, shear force and bending moment with diagrams. Analysis of trusses, beams, and frames including loads, reactions and internal forces. Cross-section geometric properties: centroid and moment of inertia of an area.</p>			
Course	The course aims to achieve the following:			

Objectives	<ul style="list-style-type: none"> <li>-Analyze forces and find out the resultant forces in two and three dimensions.</li> <li>-Differentiate between various type of supports and draw free-body-diagram.</li> <li>-Compute the reaction force, internal forces and bending moment at a specific point on a simple structure (beam, frame, truss).</li> <li>-Draw bending moment and shear force diagram to a simple structure.</li> <li>-Obtain center of gravity and centroid for deferent engineering shapes &amp; moment of inertia for deferent sections.</li> </ul>
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Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>-Formulate appropriate strategies for solving problems in engineering statics mechanics.</li> <li>-Apply methods of mathematics to solve engineering problems of bodies in static equilibrium</li> <li>-Use scalar and vector analytical techniques for analyzing forces in statically determinate structures.</li> <li>-Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems.</li> <li>-Apply basic knowledge, techniques, and skills to solve real-world problems necessary for engineering practice</li> </ul>
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4.	<b>Course name:</b>		<b>Surveying</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 2305</b>	<b>Credits number:</b>	

Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course is intended to cover the basic principles of plane surveying and its importance. These principles include tape surveying, leveling, angle measurements and determination of areas and volumes. This course is</p>
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	important in locating and describing property boundaries and in preparation of maps associated with engineering projects.
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>- Understanding the basic principles of plane surveying.</li> <li>- Being familiar with the basic tools and surveying equipment.</li> <li>- Practicing field training related to engineering applications.</li> <li>- Acquiring some skills that help students in their future work.</li> </ul>
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Developed an understanding of the principles of surveying.</li> <li>• Understood the basic skills of surveying work including distance and angles measurements.</li> <li>• Developed the skill for using surveying instrumentation.</li> <li>• Understood how to collect, document, and analyze surveying measurements.</li> <li>• Learned how to conduct a variety of surveying exercises with emphasis on layout surveys.</li> <li>• Developed an understanding of applying basic surveying techniques in the field.</li> <li>• Demonstrated an understanding of how to perform basic surveying computations.</li> </ul>

5.	<b>Course name:</b>		<b>Computer Programming</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 2309</b>	<b>Credits number:</b>	
Course	Teaching of the course deals with the following topics:			

Description	<p>The course introduces students to the fundamentals of computer programming, data structures (such as strings, matrices and arrays), logic and control structures (logical and relation expressions, conditional statement: if and switch, repetition: for while statements, vectorization), data manipulation and presentation (flowcharts, basic operating system commands loading data files, computing simple statistics and graphing data), and proper programming techniques, recursive processes, and the use of text file.</p>	
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• Teaching the basic computer programming concepts and apply them to computer- based problem-solving methods.</li> <li>• Computer programming using MATLAB a powerful high-level programming language for Engineers.</li> <li>• The development of well-structured programs, and stress the importance of good design</li> <li>• Exploring the programming concepts that will assist in learning other languages (like Java, Perl, or python</li> </ul>	
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Read, write, and debug basic programs using good programming style</li> <li>• Design, implement and evaluate a computer-based system, process, component, or program to meet desired needs and budget, by applying best practices in software development processes, methods, and tools.</li> <li>• Have a sound understanding of MATLAB as a programming language Knowing the capabilities, strengths, and weaknesses of MATLAB.</li> <li>• Apply knowledge to develop programs using MATLAB related to civil engineering applications and courses.</li> </ul>	
6.	<b>Course name:</b>	<b>Engineering Dynamics</b>

	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 2202</b>	<b>Credits number:</b>	
<b>Course Description</b>	<p>Teaching of the course deals with the following topics:</p> <p>This course covers the fundamentals of Newtonian mechanics, including kinematics, motion relative to moving reference frames, Kinetics and Newton's laws of motion, work and energy, impulse and momentum, 2D and 3D rigid body dynamics. Helps apply the above principles to practical dynamical problems</p>			
<b>Course Objectives</b>	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Introduce the concepts of dynamics.</li> <li>•Learn the mathematical formulations of dynamics problems.</li> <li>•Develop working skills in the dynamic analysis for both particles and rigid bodies.</li> <li>•Master some basics of dynamics, including free body diagrams and kinematics, and broadens those basics through the extensive use of vector math to 3-D problems.</li> <li>•Migration from 3D vector math to the math of scalars through the use of work-energy principles to solve many dynamic problems.</li> <li>•Introduce definitions and terminologies of thermodynamics.</li> <li>•Introduce some properties of thermodynamic systems, some of which are pressure, temperature and its scales, heat and work as path dependent functions, zeroth law of thermodynamics, concept of a thermodynamic equilibrium.</li> </ul>			
<b>Learning Outcomes of the Course</b>	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>•Calculate kinematic and kinetic analyses for particles and systems of particles.</li> </ul>			

	<ul style="list-style-type: none"> <li>•Compute of momentum and energy methods for particles and systems of particles.</li> <li>•Determine of kinematic and kinetic analyses for rigid bodies.</li> <li>•Evaluate of momentum and energy methods for rigid bodies.</li> </ul>
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7.	<b>Course name:</b>		<b>Mechanics of Materials</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 2304</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>This course introduces the concept of stress: normal, shearing, bearing stress, factor of safety and design consideration; Stress and strain and deformation under axial loading, stress-strain diagram, hook's law and modulus of elasticity, statically indeterminate problems, temperature changes, poisson's ratio, modulus of rigidity, generalized hook's law; Torsion: stresses and deformation in a circular shaft, angle of twist, statically indeterminate shafts; Pure bending: stress and deformations in a symmetric members in pure bending; analysis and design of beams for bending; shear and bending-moment diagrams; Shearing stresses and strain in beams and thin-walled members; Transformations of stress and strain, mohr's circle; Principal stresses under combined given loading; Columns stability of structure, euler's formula</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• Develop a strong understanding of materials behavior and response (deformation, stresses, and failure) due to various loading conditions (axial,</li> </ul>			



	<p>torsion, bending, shear) applied individually or in combinations to structural members.</p> <ul style="list-style-type: none"> <li>• Provide a solid base for further design courses.</li> <li>• Develop the ability to analyze and design simple structural members under various loading conditions and imposed constraints.</li> </ul>			
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Calculate deformation, strain, and stress that developed in materials when subjected to various loading conditions (axial, torsion, bending, shear, and combined loading.)</li> <li>• Design (and verify the design of) simple structural members.</li> <li>• Analyze simple indeterminate members by using equilibrium and compatibility equations.</li> <li>• Demonstrate skills in problem solving and analytical thinking.</li> </ul>			
8.	<b>Course name:</b>		<b>Concrete and Cement Technology</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 2306</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course is designed to provide an in depth understanding of Production, types, properties and uses of cementations materials and aggregate. Fresh and hardened concrete properties, concrete testing, effects of admixtures, and destructive and non-destructive testing of existing concrete structures.</p> <p>Concrete production, transport, casting, compacting, and curing concrete, Design of concrete mixes, durability of concrete, creep and shrinkage of concrete. The laboratory is used for the testing of the aggregates and concrete specimens in accordance with ASTM standards and the ACI code.</p>			
Course	The course aims to achieve the following:			

Objectives	<ul style="list-style-type: none"> <li>• Furnish the student with basic understanding of the ingredients of concrete and their impact on fresh and hardened properties of concrete.</li> <li>• Teach the student the most appropriate methods to mix, handle, cure, place, compact, and evaluate concrete in its fresh and hardened states.</li> <li>• Provide basic understanding of objectives of different tests performed on different construction materials.</li> <li>• Teach the student the method of testing and ensure that he/she carry out the test him/herself.</li> </ul>
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Understand the process of cement manufacturing and the purpose use of different types of cements.</li> <li>• Select appropriate aggregate and determine its physical properties.</li> <li>• Know the appropriate methods to mix, handle, place, compact, and cure concrete.</li> <li>• Design concrete mixtures to achieve fresh and hardened properties required.</li> <li>• Evaluate fresh and hardened properties in laboratory and field using destructive and non-destructive techniques.</li> <li>• Carry out different tests on cement paste or mortar, mineral aggregate, concrete in its fresh and hardened state, and reinforcing steel.</li> </ul>

9.	<b>Course name:</b>		<b>Concrete and Cement Technology Lab</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 2108</b>	<b>Credits number:</b>	
Course	Teaching of the course deals with the following topics:			

Description	<p>This course covers a range of experiments related to examining various properties to commonly used construction materials including: concrete and its constituents; cement, coarse and fine aggregate, water and admixture. Additionally, other aspects relevant to fresh and hardened concrete will also be explored such as: mixing, handling, casting (workability), density, strength and deformation. Other tests will review construction materials in terms of quality control including steel, common brick and tiles.</p>
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Gain hands on experience in conducting several laboratory experiments, to analyze data, interpret results, and write technical reports.</li> <li>•Explore the properties of constituent material of concrete, fresh and hardened concrete properties. Furthermore, different properties of aggregate, cement workability will be demonstrated.</li> </ul>
Learning Outcomes of the Course	<p>At the end of the course the student will be able to: *</p> <ul style="list-style-type: none"> <li>•Design and conduct an experiment.</li> <li>•Compare experimental results to the theoretical results and write technical reports.</li> <li>•Explain the properties of constituent material of concrete.</li> <li>•Determine the consistency and fineness of cement.</li> <li>•Calculate the setting times of cement.</li> <li>•Determine the specific gravity and soundness of cement.</li> <li>•Estimate the compressive strength of cement.</li> <li>•Determine the workability of cement concrete by compaction factor, slump.</li> <li>•Find out the specific gravity of coarse aggregate and fine aggregate by sieve analysis.</li> <li>•Work in a team.</li> </ul>

10.	<b>Course name:</b>		<b>Computer Aided Design</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 2110</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>Teaching of the course deals with the following topics:</p> <p>This course is an Introduction to computer Aided Drafting (AutoCAD). It prepares the student with the fundamentals, knowledge, skills, and abilities necessary to create a basic 2D drawing using the Auto CAD. The course shows the most essential tools and concepts, such as understanding the Auto CAD workspace and user interface, using basic drawing, editing, and viewing tools, organizing drawing objects on layers, inserting reusable symbols (blocks), preparing a layout to be plotted and adding text, hatching and dimensions. It will provide experience through a series of practical exercises and applications cover details and drawings in some civil engineering areas such as structural engineering (details for reinforced concrete structures).</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>-Develop fundamental capability of visual and graphical communications in the construction industry.</li> <li>-Emphasize interpretation and creation of graphical presentation using computer aided drafting software.</li> <li>-Provide the students with powerful tools and techniques for drawing, dimensioning, and printing 2D drawings</li> <li>-Familiarize students with the AutoCAD workspace and user interface.</li> </ul>			
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>-Navigate the AutoCAD user interfaces</li> <li>-Use precision drafting tools and fundamental features of AutoCAD to</li> </ul>			

develop 2D accurate technical drawings

- Use the techniques, skills, and modern engineering tools necessary for engineering practice.
- Develop the spatial thinking capacity in graphical abilities necessary for a correct graphical representation.
- Identify and use the commands and icons for creating primitive 2D shapes
- Create plans and drawings from preliminary line work to a finished drawing by software rather than hand drawing.

11.	<b>Course name:</b>		<b>Engineering Geology</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 2212</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>This course introduces students to geology and its importance to engineers, history of the earth and its internal structure, minerals versus rocks, composition and structure of minerals, physical features of the earth, composition and structure of rock, composing the earth, earth's external processes, weathering and soils, ground water, earthquakes and earth's interior, plate tectonics, volcanoes and volcanic hazard.</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Present the history of earth and rock formations.</li> <li>•Explain the processes that shape the surface of the Earth.</li> <li>•Evaluate the potential for geologic hazards under specific circumstances.</li> <li>•Construct a personal philosophy integrating scientific knowledge of earth materials and the impact they have on the environment.</li> </ul>			

	<ul style="list-style-type: none"> <li>•Discuss fundamentals of the engineering properties of earth materials.</li> </ul>		
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>•Have an understanding to the importance of geology in civil engineering.</li> <li>•Describe the three rock types and the processes involved in their formation.</li> <li>•Have an understanding of basic plate tectonic theory, the processes involved, and the geologic features produced by plate tectonics.</li> <li>•Understand the fundamental laws of geologic dating as they apply to determining the age of the earth, and the designation of geologic time periods.</li> <li>•Have an appreciation for the processes that shape and sculpt our landscapes.</li> </ul>		
12.	<b>Course name:</b>		<b>Scientific Research Methods and Applied Statistics</b>
	<b>Course type:</b>		<b>College requirement</b>
	<b>Course number:</b>	<b>BENG 3315</b>	<b>Credits number:</b>
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The purpose of this course is to provide a guide and learning support material in the preparation of a dissertation for honors undergraduate students. The course covers issues such as the selection of a dissertation topic, writing a proposal, conducting a literature review, selecting the research approach, devising research instruments, collecting information, analyzing and presenting information and producing a well-written dissertation.</p>		
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Provide a guide and learning support material in the preparation of a dissertation.</li> <li>•Explain how to select a dissertation topic.</li> <li>•Conduct a literature review</li> <li>•Select the research approach</li> </ul>		

	<ul style="list-style-type: none"> <li>•Devise research instruments,</li> <li>•Collect information,</li> <li>•Analyze and present information and produce a well-written dissertation.</li> </ul>
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>•Identify the problem (including narrowing and clarifying the problem);</li> <li>•Write a proposal.</li> <li>•Review the literature (including critical appraisal of literature).</li> <li>•Decide approaches and techniques to data collection (deciding whether to use a survey or a case study).</li> <li>•Construct and sample the questionnaire.</li> <li>•Measure and analyze data.</li> <li>•Structure and write the whole dissertation.</li> </ul>

13.	<b>Course name:</b>		<b>Numerical Analysis</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 3311</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course covers the methods of finding roots of nonlinear equations, solution techniques for system of linear equations, interpolation and curve fitting, polynomial and spline interpolation, least squares fit, numerical differentiation and integration, solution of ordinary differential equations initial and boundary value problems, introduction to MATLAB, roots of equations, introduction to optimization.</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Upon successful completion of Numerical Analysis, the student will have the</li> </ul>			

	<p>knowledge and skills to develop and use analytical systems to predict and solve different mathematical problems related to civil engineering</p> <ul style="list-style-type: none"> <li>•Solve mathematical problem using computer.</li> <li>•Understand the different sources of errors in numerical computations.</li> <li>•Solve linear and non-linear system of equations by different methods.</li> <li>•Differentiate and integrate equations numerically.</li> <li>•Solve system of differential equations.</li> </ul>		
<p>Learning Outcomes of the Course</p>	<p>At the end of the course the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Implement selected algorithms, both by hand and writing a computer program.</li> <li>2. Compare different algorithms with regard to efficiency and accuracy.</li> <li>3. Analyze the errors in a numerical solution.</li> <li>4. Report work undertaken on problems in a clear and comprehensive manner.*</li> <li>5. Application of appropriate methods for solving non-linear equations, comparing efficiency and convergence of each method.</li> <li>6. Use and compare various methods for obtaining approximate solutions to systems of linear equations.</li> <li>7. Compare various algorithms for obtaining numerical solutions of ordinary differential equations.</li> </ol>		
<p>14.</p>	<p><b>Course name:</b></p>		<p><b>Structural Analysis 1</b></p>
	<p><b>Course type:</b></p>		<p><b>College requirement</b></p>
	<p><b>Course number:</b></p>	<p><b>BCVL 3313</b></p>	<p><b>Credits number:</b></p>
<p>Course Description</p>	<p>Teaching of the course deals with the following topics:</p> <p>The course introduces the analysis of statically determinate structures: beams, trusses, frames, cables, and arches, influence lines, moving loads on beams</p>		



	<p>and trusses, deflection of statically determinate structures, moment-area methods, conjugate beam, virtual and real work, and analysis of indeterminate structures using approximate methods, computer-based and manual techniques, verification and interpretation of results, case studies involving local structures.</p>
<p>Course Objectives</p>	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>- The course presents the classical methods of structural analysis needed to analyze statically determinate and indeterminate structures.</li> <li>-It aims at providing the necessary analysis foundation for the design courses (reinforced concrete, steel, etc.) that typically follow this course in the traditional civil or architectural engineering curriculum.</li> <li>-It also aims at preparing the student for more advanced analysis courses.</li> <li>-The student will also become familiar with analysis methods for cable and arch structures. To learn the concept of influence lines for determinate structures in order to be prepared for highway bridge structural design.</li> </ul>
<p>Learning Outcomes of the Course</p>	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>- Learn the idealization of structures and loads (including support types in 2D and 3D).</li> <li>-Model structural components and systems using free-body diagrams</li> <li>-Evaluate the internal forces and moments in beams to develop shear force and bending moment diagrams,</li> <li>-Evaluate bending and shear stresses and deflections in beams.</li> <li>-Learn the analysis techniques of forces in cables - suspension bridges with three-hinged and two-hinged stiffening girders - three-hinged and two-hinged arches -and understanding the settlement and temperature effects.</li> </ul>

15.	<b>Course name:</b>		<b>Fluid Mechanics</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 3313</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course covers properties of fluids, Statics of fluids. Dynamics of fluids: system and control volume; equations of continuity Euler, Bernoulli, energy, linear momentum, and angular momentum with applications. Dimensional analysis and dynamic similitude. Viscous flow: laminar flow through tubes, transport phenomena, boundary layer, drag on immersed bodies hydraulic and energy grade lines, turbulent flow in pressure conduits and in open channels, steady incompressible flow through simple pipes and open channels.</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>- Obtain a solid understanding of the fundamentals of fluid mechanics.</li> <li>- Study different properties of fluid and fluid flow types.</li> <li>- Explain the conservation of mass, momentum, heat transfer and energy equations.</li> </ul>			
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>-Define different types of fluid flow (laminar, turbulent, and transition) and the appropriate discharge model for each.</li> <li>-Apply the continuity equation for engineering hydraulics problems for including both steady-state and transient systems.</li> <li>-To use the momentum equation for force calculations in both pressurized and free surface</li> </ul>			

	<p>flow systems.</p> <p>-Derive the energy equation (Bernoulli equation) and apply into pressurized flow and open channel flow systems.</p> <p>-Solve for losses in energy head due to friction and minor losses.</p> <p>-Solve for the fluid forces acting on submerged bodies in a static fluid</p>		
16.	<b>Course name:</b>	<b>Building Construction</b>	
	<b>Course type:</b>	<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 3317</b>	<b>Credits number:</b>
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course introduces to the student the construction process, characteristics of the construction industry; types of construction companies; contracts; people involved in a project, their responsibilities and interrelationships; evolution of a project; interpreting working drawings; construction bonds; contract documents including general overview of organization, relationships, practices and related terminologies.</p>		
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Construction elements starting from foundations up to isolation.</li> <li>•Physical and Chemical Tests</li> <li>•Construction technologies and materials.</li> </ul>		
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Be familiar with construction industry elements and terminologies.</li> <li>• Understand construction industry technologies and materials</li> <li>• Be aware of about quality or safety regulations.</li> <li>• Be acquainted with tests of physical and chemical properties</li> </ul>		

17.	<b>Course name:</b>		<b>Laws and Regulations of Engineering Profession</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BENG 3114</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>This course is designed to introduce undergraduate engineering students to the concepts, theory and practice of engineering ethics. It will allow students to explore the relationship between ethics and engineering and apply classical moral theory and decision making to engineering issues encountered in academic and professional careers.</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• An understanding of their duties and responsibilities as professionals through gaining knowledge of the philosophies of ethics, professional practice, and world culture.</li> <li>• Basic knowledge to make informed ethical decisions when confronted with problems in the working environment.</li> <li>• Improved awareness of potential ethical issues within an engineering context.</li> <li>• Team skills through working in teams on assignments and in-class assignments.</li> <li>• Subjective analytical skills through investigation and evaluation of ethical problems in engineering settings using accepted tests for moral problem solving.</li> </ul>			

	<ul style="list-style-type: none"> <li>• An understanding of how societal morals vary with culture and how this influences ethical thought and action.</li> <li>• Improved communications skills with regard to ethical and professional issues in engineering.</li> <li>• Know some of the classic cases as well as contemporary issues in engineering ethics.</li> </ul>								
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>•Understood of professional and ethical responsibility.</li> <li>•Improved ability to communicate effectively.</li> <li>•Recognition of the need for and an ability to engage in lifelong learning.</li> </ul>								
18.	<table border="1"> <tr> <td><b>Course name:</b></td> <td><b>Soil Mechanics</b></td> </tr> <tr> <td><b>Course type:</b></td> <td><b>College requirement</b></td> </tr> <tr> <td><b>Course number:</b></td> <td><b>BCVL 3314</b></td> </tr> <tr> <td><b>Credits number:</b></td> <td></td> </tr> </table>	<b>Course name:</b>	<b>Soil Mechanics</b>	<b>Course type:</b>	<b>College requirement</b>	<b>Course number:</b>	<b>BCVL 3314</b>	<b>Credits number:</b>	
<b>Course name:</b>	<b>Soil Mechanics</b>								
<b>Course type:</b>	<b>College requirement</b>								
<b>Course number:</b>	<b>BCVL 3314</b>								
<b>Credits number:</b>									
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course is an introductory course in the science of soil mechanics and the art of Geotechnical Engineering. It deals with all phenomena which affect the response of soils in any way associated with engineering. In this course we will study: origin of soil and grain size, weight-volume relationships, plasticity and structure of soil, soil classification, soil compaction, permeability, seepage, stresses in a soil mass, compressibility of soil, and shear strength of soil.</p>								
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Develop a fundamental understanding of the nature and peculiarities of soils, rocks and other earth materials relative to their performance in soil-structure systems.</li> </ul>								

	<ul style="list-style-type: none"> <li>•Survey the principles of analysis of soil-structure system and to review some design techniques and practices.</li> <li>•Develop a working knowledge of soils and geotechnical engineering to be able to recognize critical situations in practice and to develop a capability for detailed research for solutions to particular problems.</li> </ul>
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>•Knowledge of soil origin and mineralogy.</li> <li>•Understanding of water seepage and flow nets.</li> <li>•Differentiation between effective and total stresses.</li> <li>•Knowledge of soil properties and classifications.</li> <li>•Development of research skills and presentation skills.</li> </ul>

19.	<b>Course name:</b>		<b>Soil Mechanics Lab</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 3116</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>Performing various laboratory tests to determine the characteristics and mechanical properties of soil according to the procedures and standards set by the American Society for Testing and Materials (ASTM).</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Develop student's ability to identify physical and mechanical properties of soil in the field and laboratory settings.</li> <li>•Develop a fundamental understanding of ASTM laboratory test standards</li> </ul>			

	and procedures. <ul style="list-style-type: none"> <li>•Prepare soil samples for testing, perform the test, collect and analyze data, interpret the results and write technical reports.</li> </ul>		
Learning Outcomes of the Course	At the end of the course the student will be able to: <ul style="list-style-type: none"> <li>•Perform common soil tests to identify physical and mechanical properties of soils.</li> <li>•Be familiar with soil mechanics tests and determines which test is needed in designing civil engineering projects and/or solving engineering problems.</li> <li>•Apply the laboratory results to problem identification, quantification, and basic soil mechanics related design problem.</li> <li>•Demonstrate the ability to write clear technical lab reports.</li> <li>•Use word processors and other modern software packages in writing and finishing the report.</li> <li>•Demonstrate the ability to work in groups.</li> <li>•Understand and apply ethical issues associated with decision making and professional conduct in the lab and field environment.</li> </ul>		
20.	<b>Course name:</b>	<b>Design of Concrete Structures</b>	
	<b>Course type:</b>	<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 3318</b>	<b>Credits number:</b>
Course Description	Teaching of the course deals with the following topics: The course introduces to the students the reinforced concrete, design approaches and codes, sections under flexure and shear, design and detailing of singly reinforced rectangular beams, doubly reinforced rectangular beams, T-beams. Shear and diagonal tension in beams, bond, anchorage and development length, and one-way slabs, stairs, design of columns under concentric loading, design of isolated footings, design project with discussion		

	of current building practice.
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Cover properties of reinforced concrete materials, components, loads, design codes, and structural systems.</li> <li>•Design of reinforced concrete beams (Rectangular and T section) for shear and moment.</li> <li>•Design of continuous beams and one-way slabs (single span and continuous).</li> <li>•Design short columns under concentric loading.</li> <li>•Proportion footings and design axially loaded footings</li> <li>•Calculate termination of reinforcement and layout reinforcement to satisfy Code requirements.</li> <li>•Explain method related to the calculation of the structural capacity of reinforced concrete components associated with different failure modes, including axial compression, flexure, shear and torsion.</li> <li>•Evaluate the need to provide shear and torsion reinforcement.</li> </ul>
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Analysis and design of singly reinforced concrete beams.</li> <li>• Analysis and design of doubly reinforced concrete beams</li> <li>• Design of continuous beams and one-way slabs (single span and continuous).</li> <li>• Design short columns</li> <li>• Proportion footings and design axially loaded footings</li> <li>• Calculate termination of reinforcement and layout reinforcement to satisfy Code requirements.</li> <li>• Evaluate the need to provide shear and torsion reinforcement.</li> </ul>



21.	<b>Course name:</b>	<b>Design of concrete structure project</b>	
	<b>Course type:</b>	<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 3118</b>	<b>Credits number:</b>
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>This course covers the practical part of the design of five-story residential buildings. The distribution of columns is studied on the horizontal plan, the thickness of the roof is calculated, and how the main and secondary beams are arranged, as well as the ribs and their directions. The types of loads in the residential buildings are also identified and calculated. During this process, the method of distributing loads on beams and ribs in the slab is defined as well as the distribution of loads on the columns and on the footing. All structural elements (main beams, secondary beams, ribs, ground beams, columns and footings) are designed. Study how to deal with structural analysis programs, where “Beam Design program” is studied in the process of analyzing the beams</p>		
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>-Explain how to distribute columns on the plan.</li> <li>-Explain the method of slab thickness calculation, and the dead and live loads calculation.</li> <li>-Clarify the types of Loads in the residential buildings and the methods of its calculation and distribution on the different structural elements.</li> <li>-Illustrate the method of design structural elements.</li> </ul> <p>Introduce the student for using structural analysis software</p>		
Learning	At the end of the course the student will be able to:		

Outcomes of the Course	<ul style="list-style-type: none"> <li>-Deal with engineering plans in the engineering offices and field work.</li> <li>-Design and prepare structural plans using different programmes.</li> <li>-Design residential structural building consists of five stories.</li> </ul>		
22.	<b>Course name:</b>		<b>Structural Analysis 2</b>
	<b>Course type:</b>		<b>College requirement</b>
	<b>Course number:</b>	<b>BCVL 3320</b>	<b>Credits number:</b>
Course Description	<p>Teaching of the course deals with the following topics:</p> <ul style="list-style-type: none"> <li>-Statically indeterminate structures; degree of indeterminacy.</li> <li>-Analysis of statically indeterminate structures using the constant deformation.</li> <li>-Slope deflection method.</li> <li>-Moment distribution method.</li> <li>-Introduction to matrix analysis.</li> </ul>		
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>- providing the students the concept of analyzing indeterminate structure (deflections and internal forces) using classical and up to date methods.</li> <li>-In Addition, it discusses the approximate methods of analyses.</li> </ul>		
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>- Analyzing the statically indeterminate beams, trusses and frames using the force method</li> <li>-Analyzing the statically indeterminate beams and frames using displacement methods: slope-deflection method and moment distribution method.</li> <li>-Analyzing of beams, trusses and frames using the stiffness method</li> <li>-Understanding the concept of the finite element method</li> <li>-Analyzing of real structure problems.</li> </ul>		

-Analyze structures under moving loads using influence lines.  
 -This Course is a pre-requisite of many courses specially: Advance Structural Analysis.

23.	<b>Course name:</b>		<b>Introduction to Sustainability and Renewable Energy</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 3222</b>	<b>Credits number:</b>	
Course Description	Teaching of the course deals with the following topics: This course is designed to equip students with a strong foundational knowledge of sustainability and the balance between environmental, social, and economic systems. The materials provide students with a thorough introduction to sustainability topics such as ecosystems, energy and water challenges.			
Course Objectives	The course aims to achieve the following: - Discuss different energy resources. - Raise awareness of current problems and new insights which are at the forefront of Sustainable Energy Systems and the Environment. - Explore various environmentally sustainable systems. - Offer the knowledge and expertise the student need in relation to sustainable energy and the environmental impact of energy systems.			
Learning Outcomes of	At the end of the course the student will be able to: - Define sustainability and describe the environmental, economic, and social			

the Course	aspects of the triple bottom line. - Describe the profound impact humans have had on the ecosphere, and explain the importance of biodiversity and ecosystem services. - Differentiate between renewable and nonrenewable energy sources, and identify the key components of the green economy. - Students shall be able to apply the sustainability concepts in engineering practice to mitigate the human impact on global systems.		
24.	<b>Course name:</b>		<b>Hydraulics</b>
	<b>Course type:</b>		<b>College requirement</b>
	<b>Course number:</b>	<b>BCVL 3324</b>	<b>Credits number:</b>
Course Description	Teaching of the course deals with the following topics: Extension and application of fluid mechanics principles to hydraulic engineering problems. Pipe flow, pipe flow networks, flow measurement, open channel flow, pipeline systems, turbo machinery, unsteady flow in pipes, network project with software application of network analysis and design (EPANET, WATERCAD)		
Course Objectives	The course aims to achieve the following: - The main objectives of this course is to provide the student with a clear and through the presentation of the theory and application of Hydraulics as it applies to pipes, pumps, water distribution networks and open channels. This course will build on topics covered in Dynamics and mainly in Fluid Mechanics.		
Learning Outcomes of the Course	At the end of the course the student will be able to: <ul style="list-style-type: none"> <li>• Design, and analyze and interpret data</li> <li>• Design a Hydraulics system, its components, or process to meet required design values.</li> <li>• Use the techniques, skills, and modern engineering tools necessary for</li> </ul>		

	<p>hydraulic system practices.</p> <ul style="list-style-type: none"> <li>• Identify, formulate, and solve Hydraulic problems.</li> </ul>
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25.	<b>Course name:</b>		<b>Hydraulics Lab</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 3126</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>This course involves conducting a number of lab experiments to support and verify the principles taught in fluid mechanics and hydraulics courses. Student learning is facilitated through two 2 hr session each week. One session is on tutorial, and the other on computer and experimental laboratories. The lectures will have a practical bias. The tutorial session will be mainly problem solving, discussion and feed-back.</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• Understand the theories and applications of Hydraulics as it applies to pipes, pumps, water distribution networks and open channels.</li> <li>• Have the ability to apply hydraulic methods to engineering applications in an integrated way.</li> <li>• Get the knowledge of fluid mechanics is consolidated and problem-solving skills in dealing with water engineering tasks are acquired.</li> </ul>			
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Solve a range of hydraulic problems, from sizing pipes, selecting pumps, measuring flow in the field, and calculating open channel hydraulic profiles.</li> <li>• Think more intuitively (through laboratory experience) about hydraulic phenomena.</li> </ul>			

	<ul style="list-style-type: none"> <li>•Focus on a practical understanding of energy and energy losses (known to hydraulic engineers as head and head loss) that drive the flow of water.</li> <li>•Various methods of estimating head loss will be discussed and applied by students,</li> <li>•Make a pipe network modeling (AutoCAD, Watrecad and similar).</li> </ul>		
26.	<b>Course name:</b>		<b>Engineering Economy</b>
	<b>Course type:</b>		<b>College requirement</b>
	<b>Course number:</b>	<b>BENG 4317</b>	<b>Credits number:</b>
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>This course includes an introduction to the concepts governed in the determination of the economic feasibility of engineering undertakings, especially the time value of money, interest rates, depreciation, replacement, economic life, present value, rate of return, payback period. Other topics will include financing, supply and demand, private and social cost estimations, secondary and intangible benefits and costs, benefit-cost models, economic risk analysis, economic optimization.</p>		
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>-The objectives of this course are to provide engineering students with the basic knowledge required to analyze cost/revenues data and conduct economic analyses to enable the decision to be made on an economic basis</li> </ul>		
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>-Provide a systematic framework for evaluating the economic aspects(merits) of competing design solutions</li> <li>-Select the design with most favourable economic result.</li> </ul>		

	<p>-Use multiple solutions.</p> <p>-Distinguish between man investments aspects to choose the most suitable.</p>
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27.	<b>Course name:</b>		<b>Roads and Transportation Engineering I</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 4319</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course covers the study of vehicular transportation fundamentals including Traffic flow theory, volume, speed, level of service analysis, and delay studies, capacity analysis of signalized and un-signalized Intersections, traffic safety studies, capacity analysis of basic freeway segments, multilane, and two-lane highways, basic principles of roadway design, route location, and economy visibility studies of recommended design alternatives, geometric design involving vertical and horizontal alignment.</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Describing the four-step transport planning process, data requirements and collection.</li> <li>•Explanation of the basic parameters of traffic engineering and the methods to estimate those parameters.</li> <li>•Promoting operational efficiency and safety through the use of traffic control devices.</li> </ul>			

<p>Learning Outcomes of the Course</p>	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Describe the four-step transport planning process, data requirements and collection.</li> <li>• Analyze and assess the performance of routes and intersections through an understanding of traffic flow theories.</li> <li>• Appreciate and consider the needs of all road users, their interaction and management of their movement in an efficient and safe way.</li> <li>• Design traffic signal timings for junctions.</li> <li>• Assess different drivers when improving road safety.</li> <li>• Discuss solutions and alternatives to urban congestion.</li> </ul>			
<p>28.</p>	<p><b>Course name:</b></p>		<p><b>Environmental Engineering</b></p>	
	<p><b>Course type:</b></p>		<p><b>College requirement</b></p>	
	<p><b>Course number:</b></p>	<p><b>BCVL 4332</b></p>	<p><b>Credits number:</b></p>	
<p>Course Description</p>	<p>Teaching of the course deals with the following topics:  This course covers Water quality, treatment and regulations; physical and chemical unit processes including disinfection, coagulation, clarification, filtration, membranes, air stripping, adsorption, softening. It also presents other advanced processes for waste water treatment such as screening; sedimentation; flotation, thickening; aerobic treatment methods; theory of aeration; anaerobic digestion; disposal methods of sludge including vacuum filtration, centrifugation and drying beds; wet oxidation; removal of phosphate and nitrogen compounds; and tertiary treatment methods. This course covers also an introduction in the basic design of different unit processes in the waste water treatment plant</p>			
<p>Course Objectives</p>	<p>The course aims to achieve the following:  - Introduce basic concepts of physical and chemical parameters used to</p>			



	<p>measure water quality.</p> <ul style="list-style-type: none"> <li>- Present the fundamentals and microbiology and application to drinking water treatment, distribution, water pollution control and natural systems.</li> <li>- Develop an understanding of wastewater treatment process and management systems.</li> </ul>
<p>Learning Outcomes of the Course</p>	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>- Develop understanding and application skills in Environmental Management systems (WWTP).</li> <li>- Design functional and environmentally compatible facilities and infrastructure.</li> </ul>

29.	<b>Course name:</b>		<b>Foundation Engineering</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 4323</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The purpose of this course is to provide the students with depth knowledge and understanding of the principles governing the design of foundation systems for structures. This course covers the following subjects: subsurface exploration (borings, sampling, preparation of boring logs, and subsoil exploration report), ultimate bearing capacity of shallow foundations, lateral earth pressure, retaining walls, sheet pile walls, and pile foundations.</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Introduce to students the fundamental concepts of foundation analysis and design.</li> <li>•Develop students' ability to interpret field and laboratory data to get design</li> </ul>			

	<p>parameters for foundation analysis.</p> <ul style="list-style-type: none"> <li>• Prepare students for the effective use of the commonly used formulas, tables, and figures in the design and analysis of shallow and deep foundations.</li> <li>• Introduce some selected topics in foundation engineering.</li> </ul>								
<p>Learning Outcomes of the Course</p>	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>- Identify the essential steps involved in a geotechnical site investigation and specify appropriate laboratory test procedures for the characterization soil materials with respect to strength and compressibility.</li> <li>• Identify the principal types of foundations and describe the factors governing the choice of the most suitable type of foundation for a given situation.</li> <li>• Perform bearing capacity analyses for shallow foundations.</li> <li>• Evaluate (a) end bearing capacity and (b) skin friction for a given type of deep foundations and hence estimate the axial load capacity.</li> <li>• Prepare a geotechnical engineering report documenting procedures used and findings from site investigation.</li> </ul>								
30.	<table border="1"> <tr> <td><b>Course name:</b></td> <td><b>Design of Concrete Structures 2</b></td> </tr> <tr> <td><b>Course type:</b></td> <td><b>College requirement</b></td> </tr> <tr> <td><b>Course number:</b></td> <td><b>BCVL 4325</b></td> </tr> <tr> <td><b>Credits number:</b></td> <td></td> </tr> </table>	<b>Course name:</b>	<b>Design of Concrete Structures 2</b>	<b>Course type:</b>	<b>College requirement</b>	<b>Course number:</b>	<b>BCVL 4325</b>	<b>Credits number:</b>	
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<b>Course number:</b>	<b>BCVL 4325</b>								
<b>Credits number:</b>									
<p>Course Description</p>	<p>Teaching of the course deals with the following topics:</p> <p>This course will cover the design of two-way slab systems (solid and ribbed slabs), design of beam-columns including length effects, design of some shallow footing systems, and design for torsion.</p>								
<p>Course Objectives</p>	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• To explain the effects of slenderness, secondary moments, buckling, biaxial bending on the design of columns and to be able to design these components.</li> <li>• To explore the influence of two way bending on the design of slabs and to</li> </ul>								

	<p>be able to design these components,</p> <ul style="list-style-type: none"> <li>• To uncover the concepts required for the design of integrated reinforced concrete frames against gravity and lateral loads.</li> </ul>
<p>Learning Outcomes of the Course</p>	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Design two-way slabs.</li> <li>• Design long slender columns.</li> <li>• Calculate the structural capacity of reinforced concrete sections associated with combined axial compression and flexural loading and understand the interaction between these two modes of failure.</li> <li>• Design combined footings, strap footings and strip footing</li> </ul>

31.	<b>Course name:</b>		<b>Specifications and Quantity</b>	
			<b>Surveying</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 4329</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>This course gives an introduction to the principles and techniques of estimating construction, with emphasis on quantity take-off and pricing elements of work. The scope of work for estimate applications will include construction works from building construction projects. Upon completion of the course, students should be able to differentiate and use several types of quantity survey for different elements structures, and be able to cost and price bid items and work classifications (e.g. site work, concrete, masonry) of construction projects. In addition, also students should be understand and be familiar for specifications of different structure elements .a. concrete, block,</p>			

	plastering ...etc.		
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>-Provide students with a broad introduction to the concepts of quantity surveying and cost estimating for the preparation of the cost estimate.</li> <li>- Explore principles of quantity surveying and cost estimating and these can be applied for estimating project budgets</li> </ul>		
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Calculate of the quantity for each item for building construction as concrete, plastering and blocks, etc.</li> <li>• Analyze the cost of bid items and prepare the cost per unit price.</li> <li>• Prepare Bill of Quantities (BOQ).</li> <li>• Present the specification required for different structural elements.</li> </ul>		
32.	<b>Course name:</b>		<b>Engineering Project Management</b>
	<b>Course type:</b>		<b>College requirement</b>
	<b>Course number:</b>	<b>BENG 4316</b>	<b>Credits number:</b>
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course provide an introduction to Engineering Project Management including; project stages, roles and responsibilities of parties involved in a project, different contract types, work breakdown structure, bar charts, Critical Path Method (CPM), resource allocation, Reducing cost &amp; time and cash flow analysis. It also exposes students to the use of computer techniques, Microsoft Project, used in planning and scheduling and of construction projects.</p>		
Course Objectives	<p>The course aims to achieve the following:</p> <ol style="list-style-type: none"> <li>1. This course introduces the fundamental principles necessary for successful</li> </ol>		

	<p>management of projects. Project planning and management techniques will be discusses and the application of computers in the project management will be studied.</p> <p>2. This course is intended to equip students with the tools needed to make managerial decisions.</p> <p>3. A basic understanding of project management principles and practices</p> <p>4. An understanding of the role of time, cost and quality management in successful projects</p> <p>5. The methods, procedures, and systems for defining, planning, scheduling, controlling, and organizing project activities.</p>
<p>Learning Outcomes of the Course</p>	<p>At the end of the course the student will be able to:</p> <ol style="list-style-type: none"> <li>1. Define Project life cycle.</li> <li>2. Strategy organization</li> <li>3. Identify delivery approaches and contract types. *</li> <li>4. Conduct planning and scheduling using critical path method.</li> <li>5. Allocate resources.</li> <li>6. Perform cash flow analysis.</li> <li>7. Employ MS Project to project scheduling.</li> </ol>

33.	<b>Course name:</b>		<b>Roads and Transportation Engineering II</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 4328</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course covers pavement types and definitions, soil classification for</p>			

	highway purposes, bituminous material types and tests, uses of asphalt in highways, design of bituminous mixtures by Marshall Procedure, analysis of rigid and flexible highway pavement stresses (one layer system), Pavement layers, calculations of equivalent single axle load, design of rigid and flexible highway pavement by AASHTO procedure.		
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Pavement structure and materials.</li> <li>•Concepts of road pavement design and properties of materials.</li> <li>•Principles of geometric design, both vertical and horizontal.</li> <li>•Design of flexible highway pavement by AASHTO procedure.</li> </ul>		
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>•Select the appropriate materials for use in different road layers.</li> <li>•Perform road pavement analysis and design.</li> <li>•Apply the principles of geometric design in the design of intersections.</li> <li>•Apply the code of practice in the design of flexible road pavements.</li> <li>•Design the geometric curves of a road pavement.</li> <li>•Perform full road pavement design.</li> </ul>		
34.	<b>Course name:</b>		<b>Design of Steel Structure</b>
	<b>Course type:</b>		<b>College requirement</b>
	<b>Course number:</b>	<b>BCVL 4332</b>	<b>Credits number:</b>
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course covers the properties of structural steel, elastic design and analysis of structural elements: tension members, compression members; beams; beam columns, connections, weld and bolt design, design of trusses and moment resisting frames; introduction to plastic design.</p>		
Course	The course aims to achieve the following:		

Objectives	<ul style="list-style-type: none"> <li>• Provide students with the knowledge and skills required</li> <li>• Analyze indeterminate structures using approximate methods</li> <li>• Design steel structures.</li> </ul>
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Describe the material properties of steel.</li> <li>• Analyze indeterminate frames and trusses using approximate methods of analysis.</li> <li>• Determine the ultimate tensile capacity of steel members.</li> <li>• Describe different welding techniques and classify various types of bolts and their insulations.</li> <li>• Determine the ultimate bending moment capacity of steel members.</li> <li>• Design bolted connections in shear and tension.</li> </ul>

35.	<b>Course name:</b>		<b>Sanitary Engineering</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 4334</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>This course will introduce the principles and practices of wastewater and storm-water collection systems. Sewer design issues, the hydraulic design of gravity and pressure sewers, sewer system layout, appurtenances and structural design of sewer lines will be discussed. In addition, an introduction to wastewater and sludge treatment will be provided.</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>- Provide students with a broad understanding of design and operation of wastewater collection systems.</li> </ul>			

	<ul style="list-style-type: none"> <li>- Present the basic design and materials used in storm-water systems.</li> <li>- Give students an overview of various wastewater treatment methods.</li> <li>- Explore various sludge treatment methods.</li> </ul>		
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>- Define different types of sewer systems and sources of sanitary sewage.</li> <li>- Determine quantity of sanitary sewage.</li> <li>- Quantify quantities of storm water using various methods. Explain physical, chemical and biological characteristics of sewage. Design of wastewater collection system.</li> <li>- Discuss types of sewer line rehabilitation and corrosion control.</li> <li>- Design storm water collection system.</li> <li>- Identify sludge treatment and disposal</li> </ul>		
36.	<b>Course name:</b>		<b>Hydrology</b>
	<b>Course type:</b>		<b>College requirement</b>
	<b>Course number:</b>	<b>BCVL 4336</b>	<b>Credits number:</b>
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>This course covers the principles of the physical hydrology and its engineering applications. It covers the the processes involved in generation, and movement of water above and below the ground surface, which compose the natural hydrological cycle. The course also covers the principles of the frequency analysis for the purposes of hydrological design and analysis. The urban hydrology is studied through this course, in order to introduce the design approaches for the storm water drainage and harvesting systems. This course introduces the principles for analysis of groundwater systems that includes the confined and unconfined aquifers. The concepts of wells analysis and design are covered. The course utilizes a variety of software and computer applications for the hydrological analysis applications.</p>		
Course	The course aims to achieve the following:		



Objectives	-This course ultimately aims at introducing the students to the design and analysis approaches of the variety of hydrological facilities..
Learning Outcomes of the Course	At the end of the course the student will be able to: - Analyze hydrological problems considering the interrelations between relevant physical phenomena; - To follow the appropriate approaches for the design of hydrological facilities according to the available data, and the case conditions. The student is expected to have the sufficient knowledge that qualifies him/her to judge the validity of the models for each case; - To use computerized software appropriately in order to produce engineering reports and designs that satisfy the professional requirements in the field.

37.	<b>Course name:</b>		<b>Geographical Information Systems</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 5331</b>	<b>Credits number:</b>	
Course Description	Teaching of the course deals with the following topics: This course was designed for a two-week lecturing module on the principles of geographic information systems, to be taught. The course introduces students to GIS terminology, the concept of relational databases, spatial data models, topology, raster data and vector data. Data entry methods, including quality control and metadata are discussed. The student is introduced to spatial analysis applications including terrain analysis, data manipulation and visualization. Students apply knowledge in the laboratory using GIS software.			
Course Objectives	The course aims to achieve the following: - Use spatial data and geographic information systems.			

	<ul style="list-style-type: none"> <li>• Practice GIS software to analyze spatial data</li> <li>• Use spatial data and maps.</li> <li>• Investigate raster layer and vector layers.</li> </ul>								
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>- Manage the spatial references of different data sources.</li> <li>• Manipulate and interrogate layers in a GIS.</li> <li>• Create basic maps with the necessary elements for users to interpret.</li> </ul>								
38.	<table border="1"> <tr> <td><b>Course name:</b></td> <td><b>Construction Safety</b></td> </tr> <tr> <td><b>Course type:</b></td> <td><b>College requirement</b></td> </tr> <tr> <td><b>Course number:</b></td> <td><b>BCVL 5233</b></td> </tr> <tr> <td><b>Credits number:</b></td> <td></td> </tr> </table>	<b>Course name:</b>	<b>Construction Safety</b>	<b>Course type:</b>	<b>College requirement</b>	<b>Course number:</b>	<b>BCVL 5233</b>	<b>Credits number:</b>	
<b>Course name:</b>	<b>Construction Safety</b>								
<b>Course type:</b>	<b>College requirement</b>								
<b>Course number:</b>	<b>BCVL 5233</b>								
<b>Credits number:</b>									
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course covers the explanation of requirements of the occupational safety and health act and other related federal and state legislation as applied to the building construction industry</p>								
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>• Raise awareness among students on the importance of Health and Safety issues in construction.</li> <li>• Emphasize the roles of different parties, involved in a construction project, towards enforcing Health and Safety regulations.</li> <li>• Provide an understanding of accident causes and prevention as they related to the construction industry.</li> <li>• Be familiar with regulation and standard for construction, compensation, insurance, and construction safety management control systems.</li> <li>• Develop accompany specific safety compliance program.</li> </ul>								
Learning Outcomes of	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>-Explain health and safety laws and regulations.</li> </ul>								

the Course	<ul style="list-style-type: none"> <li>• Apply health and safety regulations and practices on project sites.</li> <li>• List hazards and risks associated with different construction projects.</li> <li>• Explain health and safety duty holders within a construction project.</li> <li>• Employ health and safety measures</li> </ul>
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39.	<b>Course name:</b>		<b>Cost Analysis and Management</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 5338</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course includes the study of the types of cost estimation from the conceptual phase through the more detailed design phase and operations of a construction project, in addition, the course highlight the importance of controlling costs and how the monitor project cash flow. This course examines the various cost components and methods used to arrive at an accurate estimate of the project costs. The student will work on a break-even analysis and earned value method of construction tasks in a project.</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>•Labor, Material, and Equipment costs</li> <li>•Indirect costs</li> <li>•General and Administration costs (G&amp;A)</li> <li>•Construction cost control methods</li> <li>•Earned value method (EVM)</li> </ul>			
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>• Enumerate the components of project cost.</li> <li>• Identify and use various standards in cost estimates</li> </ul>			

- Differentiate between direct and indirect cost.
- Conduct cost estimates for different project resources.
- Determine the markup and profit for a product.
- Control and assessment the project costs
- Forecast total project cost at a specific point in time with respect to measured progress.

40.	<b>Course name:</b>	<b>Construction Contract Documents</b>	
	<b>Course type:</b>	<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 5240</b>	<b>Credits number:</b>
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>The course is designed to familiarize students with contract documents used in construction industry. Emphasis is placed on the organization and uses of architectural/ engineering drawings and specifications in the construction process. This course will provide students with types of construction contracting delivery methods, types of construction contracts like; cost plus, fixed price and unit price contracts, the coverage of the documents generated for and during the construction process such as invitation to bid, general and particular conditions of contract, general and special specifications, drawings, schedules and bonds....etc. The focus is on the Project phases, in terms of preparations, bidding and awarding the contract. An in-depth study of the FIDIC contracts concentrating on the FIDIC</p>		
Course Objectives	<p>The course aims to achieve the following:</p> <p>- The aim of this course is to provide students with a thorough description of the construction Contract Documents used in the construction industry. This includes working drawings, bill of quantity, specifications, general condition, special condition, bonds, and other documents designed to enable the student</p>		

	to read and interpret complete set of contract documents for residential and light commercial projects.
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"> <li>-Identify different contract types.</li> <li>-Understand each of the contract documents</li> <li>- Conduct the administration of the construction contract from contract award through completion.</li> <li>-Understand the structure and terms of the FIDIC contracts;</li> <li>-Analyze claims and disputes.</li> <li>-Understand the rights, duties and responsibilities of each party to a construction contract.</li> </ul>

41.	<b>Course name:</b>		<b>Graduation Project</b>	
	<b>Course type:</b>		<b>College requirement</b>	
	<b>Course number:</b>	<b>BCVL 5344</b>	<b>Credits number:</b>	
Course Description	<p>Teaching of the course deals with the following topics:</p> <p>Preparatory studies of the literature and data collection for the graduation project in a particular area of concentration and under the supervision of one of the faculty members. The course covers directed readings in the literature of civil engineering, introduction to research methods, seminar discussions dealing with special engineering topics of current interest. Planning, design, construction and management of an engineering project. Writing a technical report.</p>			
Course Objectives	<p>The course aims to achieve the following:</p> <ul style="list-style-type: none"> <li>- The main objective of this course is to prepare students for the practical tasks of the work place after graduation. This includes building his/her ability</li> </ul>			

	to perform a complete project.
Learning Outcomes of the Course	<p>At the end of the course the student will be able to:</p> <ul style="list-style-type: none"><li>• Structure a working schedule for the project.</li><li>• Present Clear aim and objectives of the graduation project.</li><li>• Present the literature review with relation to the selected topic.</li><li>• Carry out the design (or any topic selected).</li><li>• Write a technical report.</li><li>• Defend the technical report in front of a committee and be able to answer questions asked by the committee members.</li></ul>



