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Ministry of Education
Najran University
College of Engineering
Civil Engineering Department

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The Academic Plan of Civil Engineering Department

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The Academic Plan

The plan of study for Civil Engineering Program is shown in Table 1 and Table 2. Student will be admitted to Civil Engineering Program after completion the two semesters (level 1 and level 2) in the Preparatory year Program that consists of 27 credit hours including 6 credit hours Math courses, in addition to other educational courses. The courses of curriculum of civil engineering program are shown in subsequent figures 1- 8 as shown below. The curriculum consists of 138 credit hours. The curriculum includes eight courses general education. This general education consists of six courses of 12 credit hours called university requirements (these courses are Arabic Language and Islamic Studies) and two courses of 5 credit hours communication skills (English courses). The study plan includes nine courses of 32 credit hours mathematics and basic sciences. These courses cover four basic science math, math based physics, chemistry and Computer Programming. The curriculum also includes 26 courses of 75 credit hours core civil and engineering courses (of which 69 hours are mandatory and 6 hours are elective). In addition to one course co-operative field training of zero credit hour.

Table 1 Curriculum of Civil Engineering Program

Requirements		Total Credit Hours	The percentage of the total hours of the study plan	Number of Courses	Remarks
University Requirements	Mandatory	12	8.7 %	6	Completion of the preparatory year is a requirement for admission to the College of Engineering
	Elective	--			
College Requirements	Mandatory	51	% 37	17	
	Elective	--			
Department Requirements	Mandatory	69	50 %	25	
	Elective	6	4.35 %	2	
Total		138		50	

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Table 2 Distribution of Credits Hours, Contact, Lectures, Laboratory and Tutorial Hours in the Updated Plan of Civil Engineering Program

Level	Credit Hours	Contact Hours	Lectures	Lab.	Tut.
1st Level (Preparatory Year)	14				
2nd Level (Preparatory Year)	13				
3rd Level	18	19	17	2	0
4th level	18	21	17	2	2
5th Level	18	24	15	6	3
6th Level	18	23	17	2	4
7th Level	18	26	15	6	5
8th Level	17	25	16	4	5
9th Level	17	23	15	4	4
10th Level	13	19	13	2	4
11th Level	0	1	1	0	0
Total Credit Hours	165 Hours	181 Hours	Hours 126	Hours 28	Hours 27

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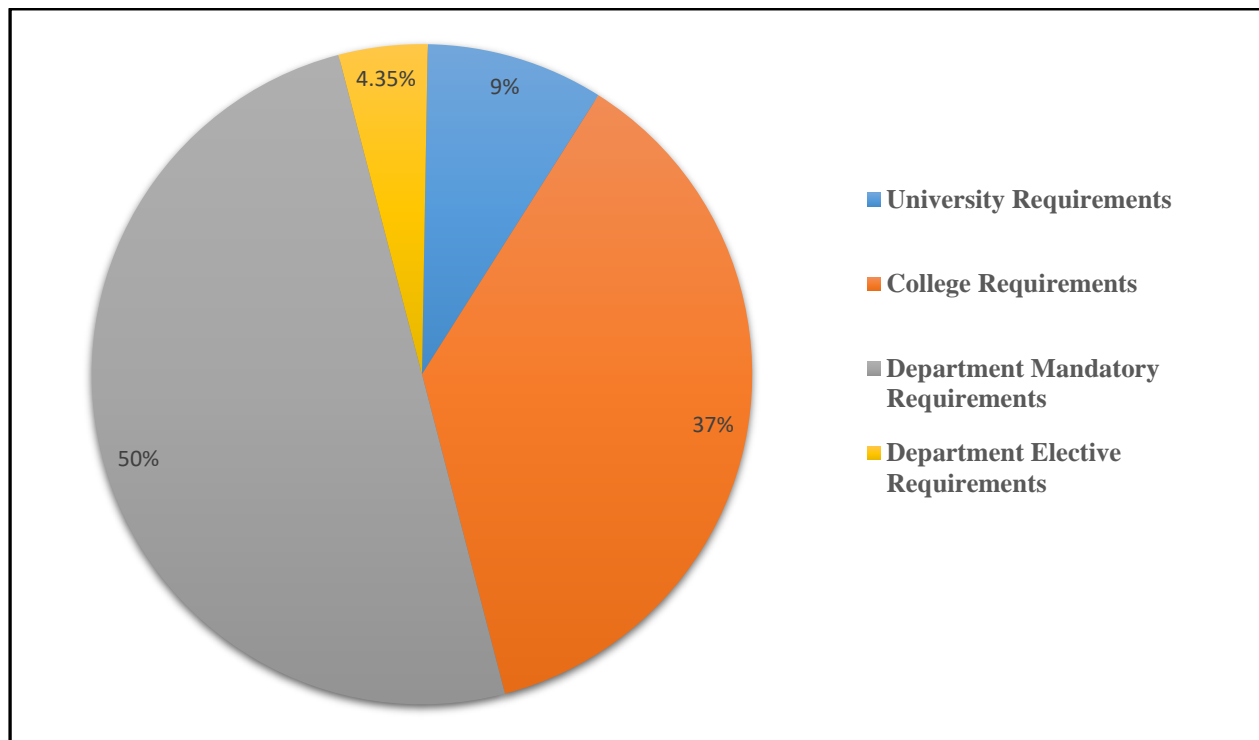وزارة التعليم
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Fig.1 Distribution of Credit hours of the department's updated plan
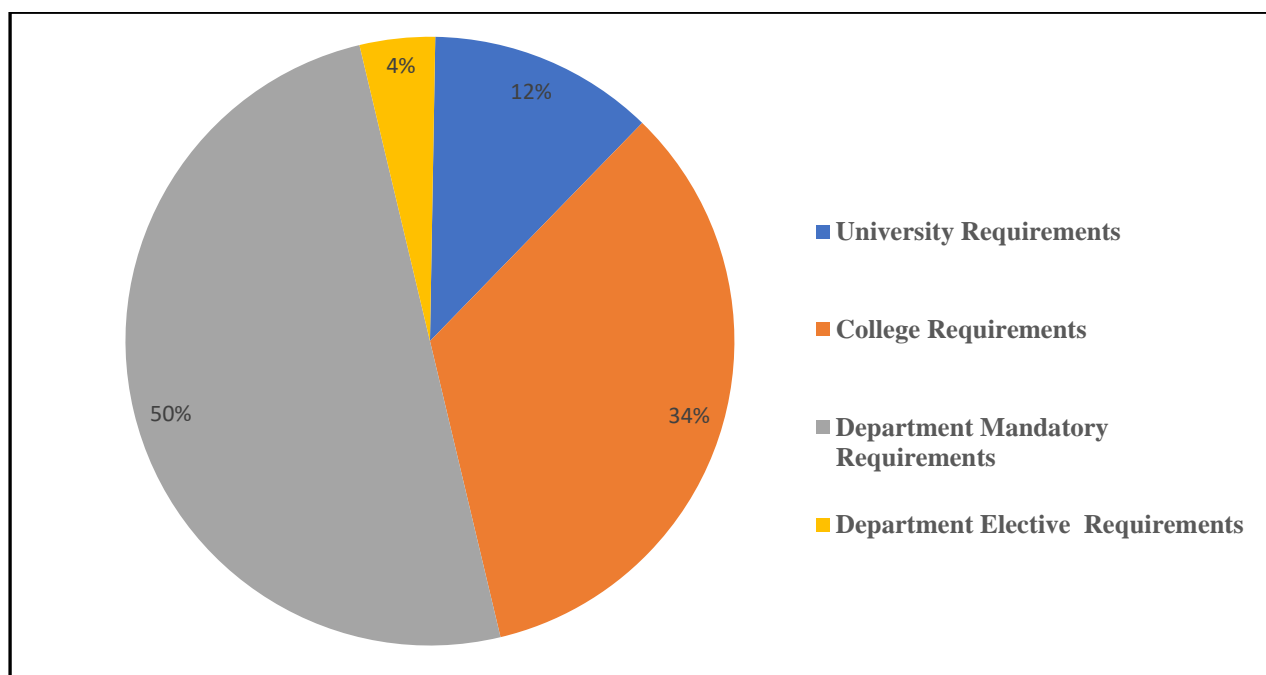
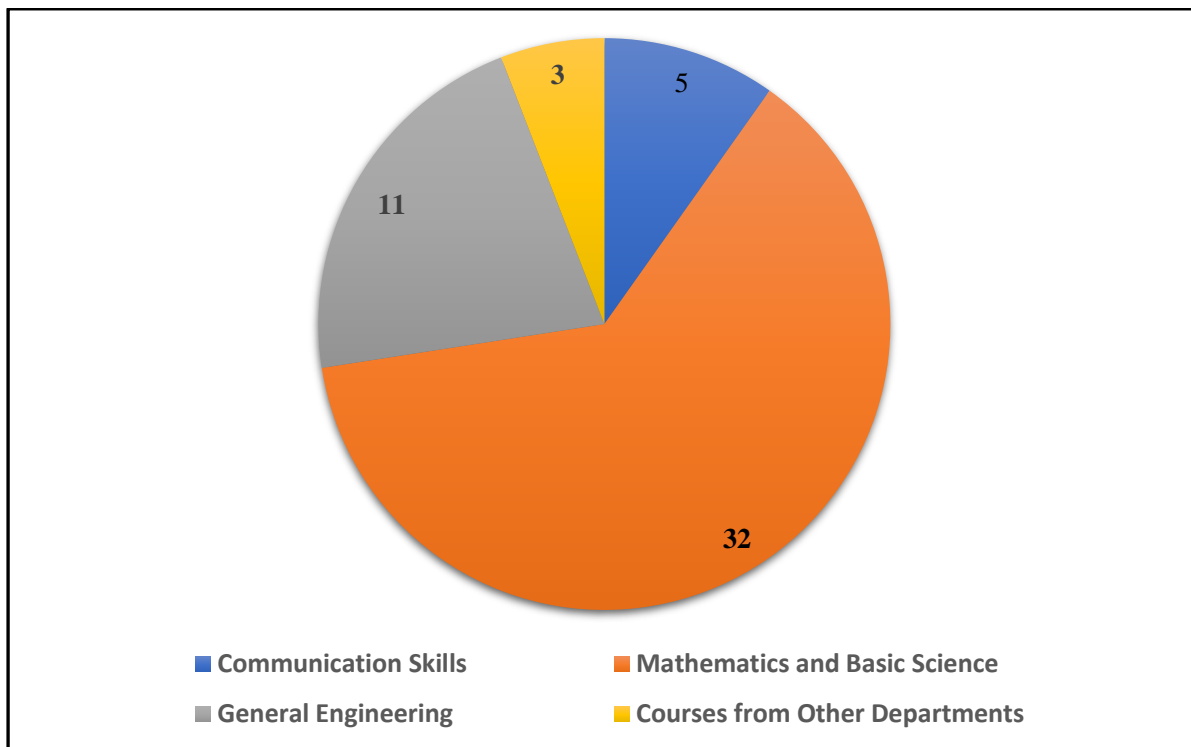**Fig.2** Distribution of number of courses in the department's updated plan

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Fig.3 Distribution of the College Requirements Courses Credit Hours
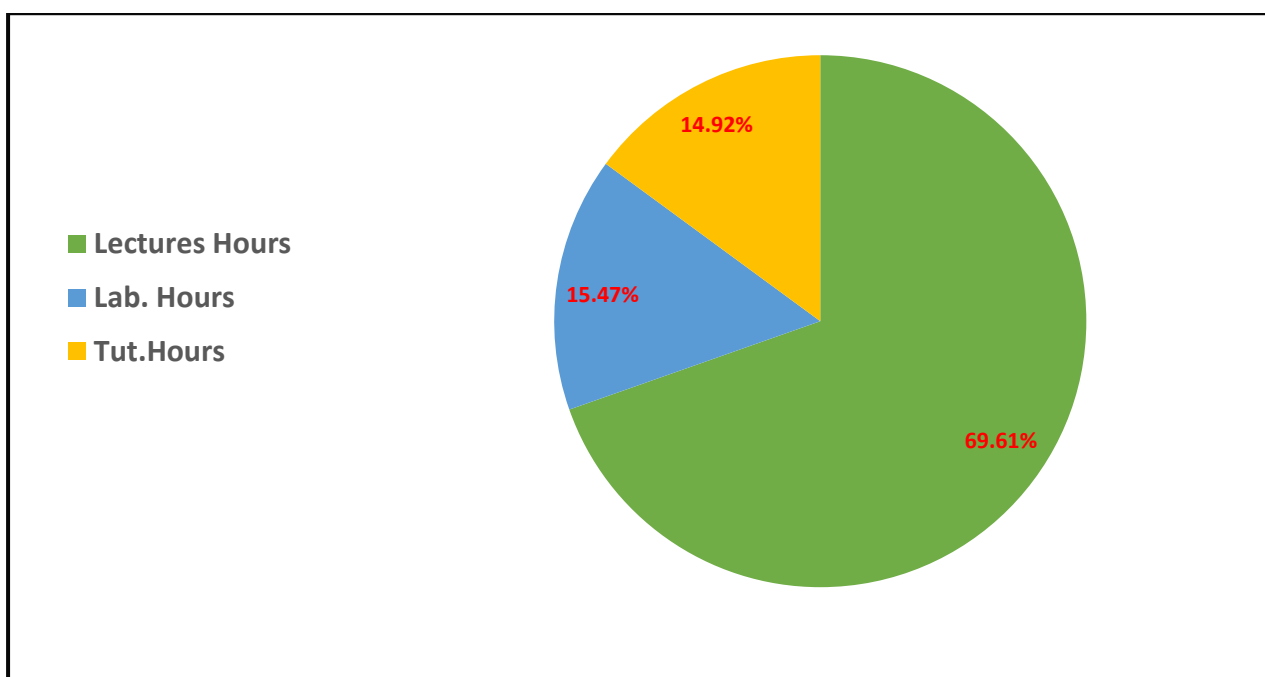
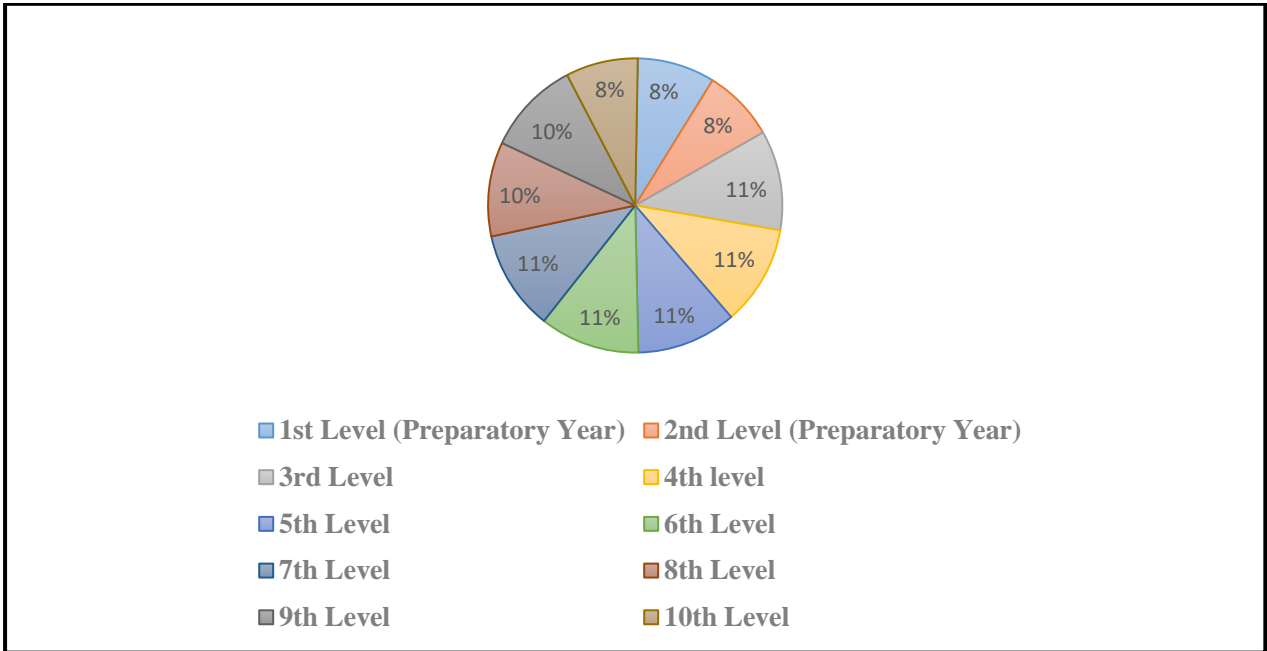**Fig.4** Distribution of total contact hours in the department's updated plan

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Fig.5   Distribution of credits hours at different program level
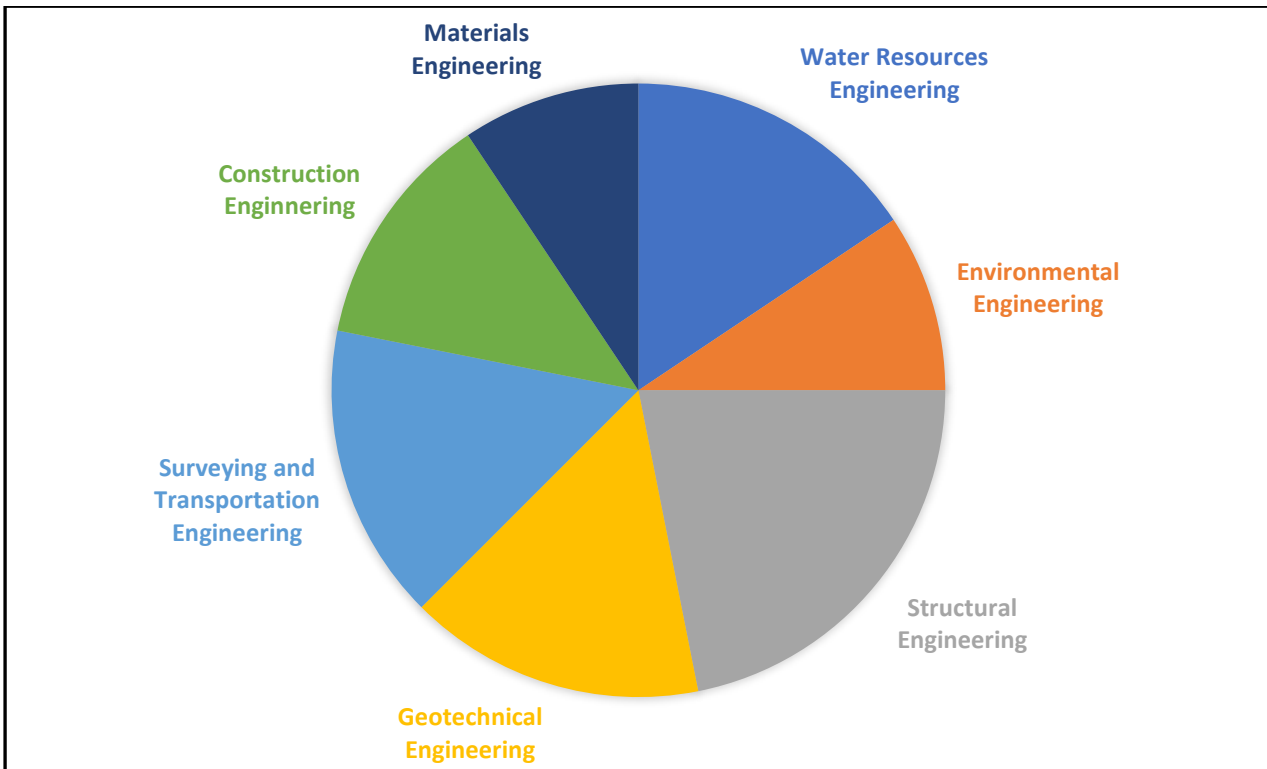
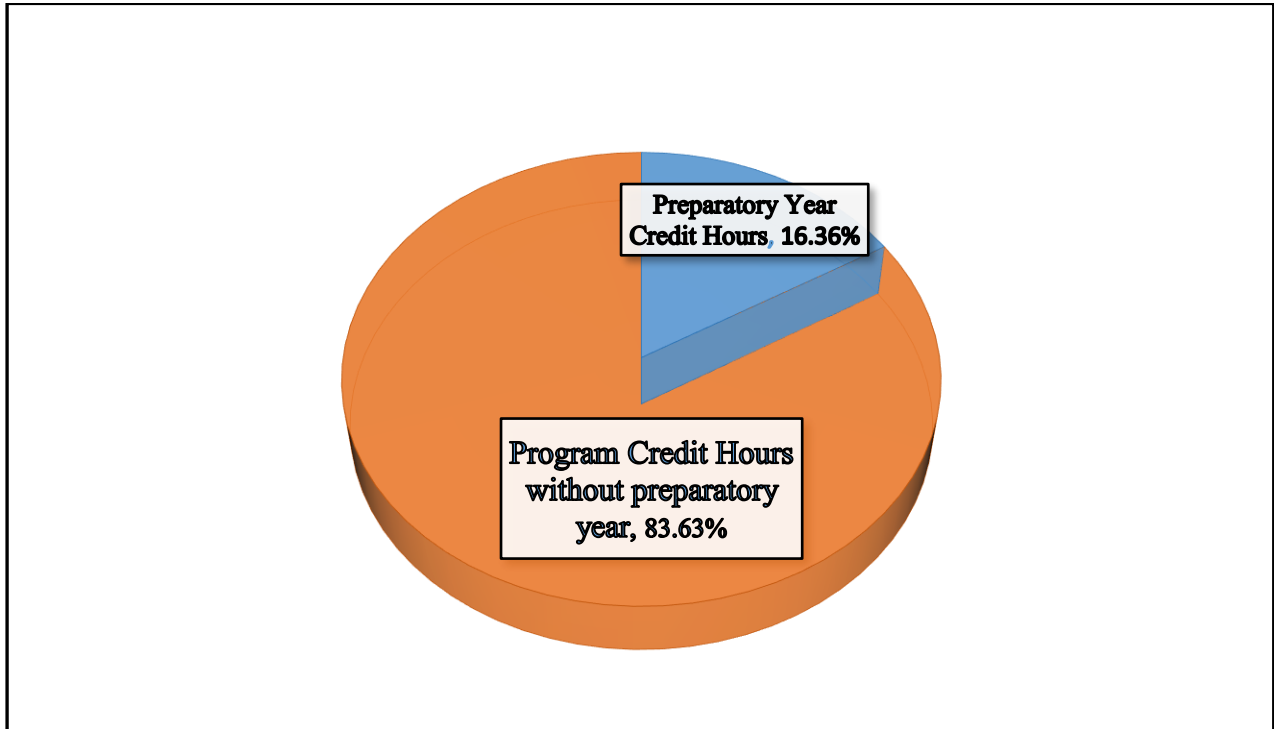**Fig.6**   Distribution of Courses between different areas of the program

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Fig.7 Comparison of program hours between the preparatory year and the rest of the program levels

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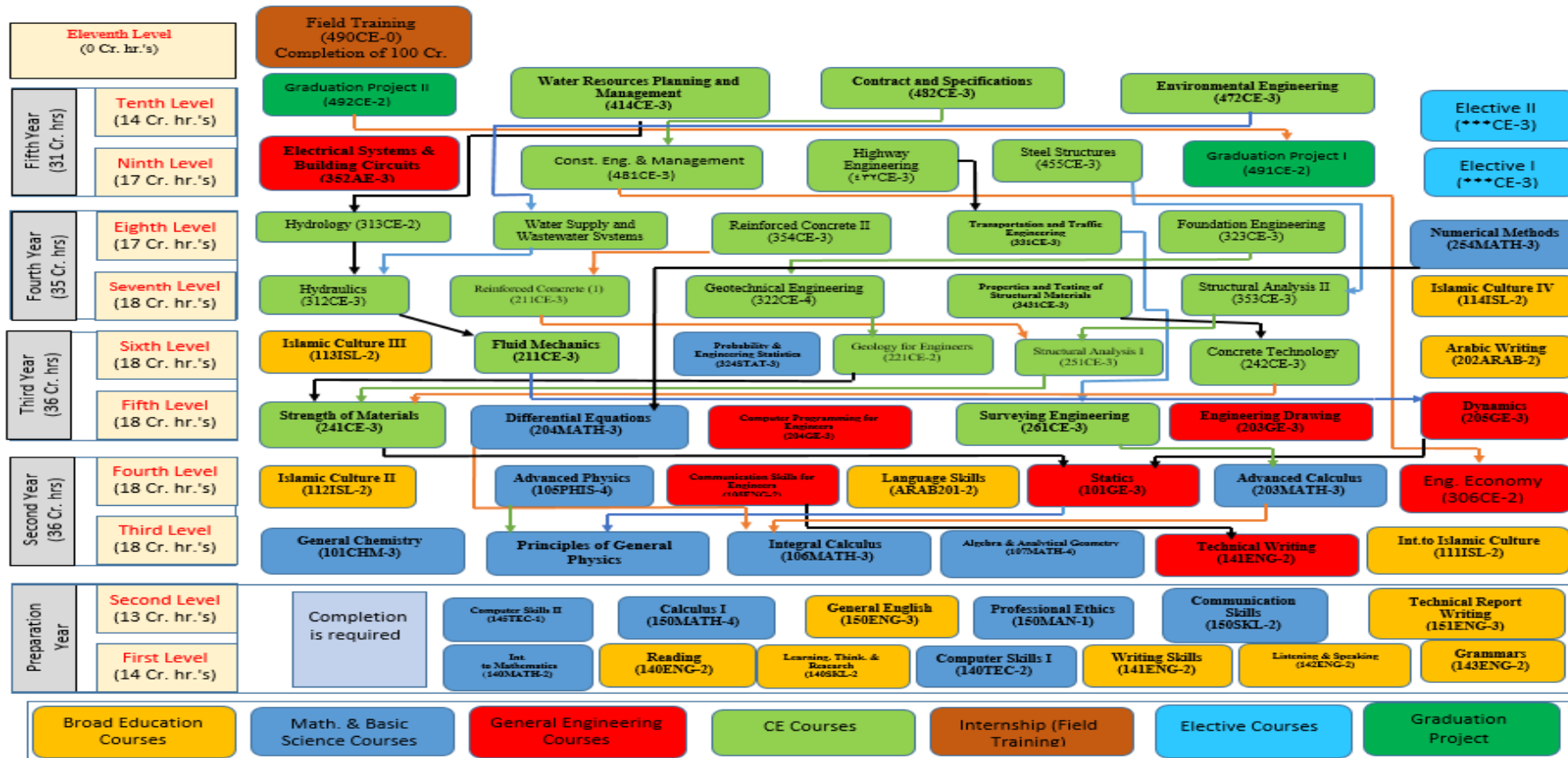
Fig.8   The curriculum chart of the updated plan

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Level (1st)   (Preparatory Year)

Code	Course Title	Contact Hours	Credit Hours	Pre-requisite
140MATH-2	Introduction to Mathematics	3	2	---
140ENG-2	Reading)skill)	4	2	---
140SKL-2	Learning, Thinking & Research (skill)	2	2	---
140TEC-2	Computer Skills I	4	2	---
141ENG-2	Writing Ethics)skill)	4	2	---
142ENG-2	Listening & Speaking	4	2	---
143ENG-2	Grammar	4	2	---
Total Credit Hours		25	14	---

Level (2nd)   (Preparatory Year)

Code	Course Title	Contact Hours	Credit Hours	Pre-requisite
145TEC-1	Computer Skills II	2	1	---
150MATH-4	Calculus I	5	4	---
150ENG-3	General English	10	3	---
150MAN-1	Professional Ethics	1	1	---
150SKL-2	Communication Skills	2	2	---
151ENG-2	Technical Report Writing	6	2	---
Total Credit Hours		26	13	---

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Level (3rd)

Code	Course Title	Contact Hours (Lect., Lab, Tut.)	Credit Hours	Pre-requisite	Remarks
101CHM-3	General Chemistry	3 (3, 0, 0)	3		---
104PHIS-4	Principles of General Physics	5 (3, 2, 0)	4		---
106MATH-3	Introduction to Integration	3 (3, 0, 0)	3	Completion of preparatory year	---
107MATH-3	Algebra & Analytical Geometry	3 (3, 0, 0)	3		---
107ENG-3	Technical Writing	3 (3, 0, 0)	3		---
111ISL-2	Introduction to Islamic Culture 1	2 (2, 0, 0)	2		----
Total Hours		**19 (17, 2, 0)**	**18**	---	---

Level (4th)

Code	Course Title	Contact Hours (Lect., Lab, Tut.)	Credit Hours	Pre-requisite	Remarks
112ISL-2	Introduction to Islamic Culture 2	2 (2, 0, 0)	2		
105PHIS-4	Advanced Physics	5 (3, 2, 0)	4	104PHIS-4	---
108ENG-2	Communication Skills for Engineers	2 (2, 0, 0)	2	107ENG-3	---
Arab 201-2	Language Skills	2 (2, 0, 0)	2	---	
101GE-3	Statics	4 (3, 0, 1)	3	104PHIS-4	---
203MATH-3	Advanced Calculus	3 (3, 0, 0)	3	106MATH-3	---
306GE-2	Engineering Economy	3 (2 ,0 ,1)	2	---	---
Total Hours		**21 (17, 2, 2)**	**18**	---	---

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Level (5th)

Code	Course Title	Contact Hours (Lect., Lab, Tut.)	Credit Hours	Pre-requisite	Remarks
241CE-3	Strength of Materials	4 (3, 0, 1)	3	101GE-3	---
204MATH-3	Differential Equations	3 (3, 0, 0)	3	106MATH-3	---
204GE-3	Computer Programming for Engineers	4 (2,2,0)	3	---	---
261CE-3	Surveying Engineering	5 (2, 2, 1)	3	203MATH-3	---
203GE-3	Engineering Drawing	4 (2, 2, 0)	3	---	---
205GE-3	Dynamics	4 (3, 0, 1)	3	101GE-3	---
Total Hours		**24 (15, 6, 3)**	**18**	---	---

Level (6th)

Code	Course Title	Contact Hour (Lect., Lab, Tut.)	Credit Hours	Pre-requisite	Remarks
113ISL-2	Islamic Culture III	2 (2, 0, 0)	2	---	---
211CE-3	Fluid Mechanics	5 (2, 2, 1)	3	205GE-3	
324STAT-3	Probability and Engineering Statistics	3 (3,0, 0)	3	---	---
221CE-2	Geology for engineers	3 (2, 0,1)	2	241CE-3	
251CE-3	Structural Analysis (1)	4 (3,0, 1)	3	241CE-3	
242CE-3	Concrete Technology	4 (3, 0,1)	3	241CE-3	
202ARAB-2	Arabic Writing	2 (2, 0, 0)	2	---	
Total Hours		**23 (17, 2, 4)**	**18**	---	---

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Level (7th)

Code	Course Title	Contact Hour (Lect., Lab, Tut.)	Credit Hours	Pre-requisite	Remarks
312CE-3	Hydraulics	5 (2, 2,1)	3	211CE-3	---
352CE- 3	Reinforce Concrete (1)	4 (3, 0, 1)	3	251CE-3	
322CE-4	Geotechnical Engineering	6(3 ,2 ,1)	4	221CE-2	
343CE-3	Properties and Testing of structural Materials	5 (2, 2, 1)	3	242CE-3	
353CE-3	Structural Analysis (2)	4 (3, 0, 1)	3	251CE-3	
114ISL-2	Islamic Culture IV	2 (2, 0, 0)	2	---	---
Total Hours		**26 (15, 6, 5)**	**18**	**---**	**---**

Level (8th)

Code	Course Title	Contact Hour (Lect., Lab, Tut.)	Credit Hours	Pre-requisite	Remarks
313CE-2	Hydrology	3 (2, 0, 1)	2	312CE-3	
371CE-3	Water Supply and Wastewater Systems	5 (2, 2, 1)	3	312CE-3	
354CE- 3	Reinforced Concrete (2)	4 (3, 0, 1)	3	352CE- 3	
331CE-3	Transportation and Traffic Engineering	4 (3, 0, 1)	3	CE-3261	
323CE-3	Foundation Engineering	4 (3, 0, 1)	3	322CE-4	
254Math-3	Numerical Methods	3 (3,0,0)	3	204MATH-3	
Total Hours		**25 (16, 4, 5)**	**17**	**---**	**---**

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Level (9th)

Code	Course Title	Contact Hour (Lect., Lab, Tut.)	Credit Hours	Pre-requisite
352AE-3	Electrical Systems & Building Circuits	3 (3 ,0 ,0)	3	------
481CE-3	Construction Engineering and Management	4 (3, 0, 1)	3	306GE-2
432CE-3	Highway Engineering	5 (2, 2, 1)	3	331CE-3
455CE-3	Steel Structures	4 (3,0,1)	3	353CE-3
491CE-2	Graduation Project I	3 (1, 2, 0)	2	Completion of 100 Credit Hours
CE-I***	*Elective I	4 (3, 0, 1)	3	
Total Hours		**23 (15,4,4)**	**17**	---

Level(10th)

Code	Course Title	Contact Hour (Lect., Lab, Tut.)	Credit Hours	Pre-requisite	Remarks
492CE-2	Graduation Project II	3 (1 ,2 ,0)	2	491CE-2	
414CE-2	Water Resources Planning and Management	4 (3, 0, 1)	3	313CE-2	
482CE-3	Contract and Specifications	4 (3, 0, 1)	3	481CE-3	
472CE-3	Environmental Engineering	4 (3, 0, 1)	3	371CE-3	
CE-II***	*Elective II	4 (3, 0, 1)	3		
Total Hours		**19 (13,2,4)**	**14**		---

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Level (11ᵗʰ)

Code	Course Title	Contact Hour (Lect., Lab, Tut.)	Credit Hours	Pre-requisite
490CE-0	Field Training	---	0	Completion of 100 Credit Hours

* (Total Credit Hours = 138)

* (Total Credit Hours with Preparatory Year = 165)

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Elective Courses for 9th Level

.No	Code	Course Title	Contact Hour (Lect., Lab, Tut.)	Credit Hours	Pre-requisite
1	415CE-3	Design of Hydraulics Structures	4 (3,0,1)	3	312CE-3
2	424CE-3	Improvement of Geotechnical Materials	4 (3,0,1)	3	322CE-4
3	462CE-3	Remote sensing and GIS Applications in Civil Engineering	5 (2,2,1)	3	261CE-3
4	456CE-3	Analysis and Design of Buildings	4 (3,0,1)	3	354CE-3
5	483CE-3	Construction Cost Estimation	4 (3,0,1)	3	306GE-2
				15	

Elective Courses for 10th Level

.No	Code	Course Title	Contact Hour (Lect., Lab, Tut.)	Credit Hours	Pre-requisite
1	473CE-3	Environmental assessment and management of environmental systems	4 (3,0,1)	3	313CE-2
2	425CE-3	Selected Topics in Geotechnical Engineering	4 (3,0,1)	3	322CE-4
3	433CE-3	Transportation planning	4 (3,0,1)	3	331CE-3
4	457CE-3	Selected topics in Structural Engineering	4 (3,0,1)	3	354CE-3
5	484CE-3	Selected Topics in Construction Engineering	4 (3,0,1)	3	481CE-3
				15	

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——————————————— **Courses of level 1** ———————————————

140MATH-2 Introduction to Mathematics   2 (2 , 0 , 0)

Objective:
Students able to build strong and sound understanding of Pre-calculus as a solid foundation for subsequent courses in mathematics and other disciplines as well as for applying in the real life.

Course Description:
This course is designed to cover topics in Algebra enhanced with pre-algebra topics such as arithmetic, fractions, and word problems as need, Trigonometry concepts such as Law of Sines and Cosines will be introduced. Topics include real numbers, linear equations and inequalities in one variable, polynomials, factoring, algebraic fractions, and quadratic equations, review of manipulative algebra; introduction to functions and graphs, including linear, quadratic, rational functions, logarithmic and exponential, and trigonometric functions.

Textbook:
Pre-Calculus Made Simple, A. H. Khashan, S. T. Obeidat and, K. H. Khashan,The King Saud University, 2nd Edition Year: 2014.

Other references:
●College Algebra with Trigonometry, 8e by Raymond Barnett Michael Ziegler Karl Byleen.
●College Algebra and Trigonometry: Graphs and Models, by Raymond Barnett Michael Ziegler Karl Byleen.
●Pre-calculus: Graphs and Models, 3e by Raymond Barnett Michael Ziegler Karl Byleen David Sobecki

140ENG-2   Reading   2 (2 , 0 , 0)

The main purpose of this course is to equip students with the basic skills and strategies necessary for a successful reader of academic texts.

Course Description:
This course aims to enable students to read academic paragraphs effectively; build vocabulary and take notes. The course guide students to employ basic reading skills and strategies: It will help students to skim for and distinguish between topics and main ideas. It will also facilitate recognizing supporting details by using punctuation marks, numbers and connecting words. In addition, the course make use of contextual clues to infer meanings of unfamiliar words from context. To better understand a text, the course help students to use graphic organizers, mind mapping, outlining, literal meaning and inferences.

Textbook:
Reading Power 1: by Linda Jeffries and Beatrice S. Mikulecky
Other references:
●Book Dictionary
● Smart Online and Offline Dictionaries
●Teacher's manual

140SKL-2   Learning, Thinking, and Research Skills   2 (2 , 0 , 0)

Objective:
To help students acquire learning, thinking, and research skills. .

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Course Description:

The course content three unit the first one is approaches of research units (how to search for information - knowledge economy, second one is thinking skills (critical - creative - problem solving - knowledge beyond) and third one is learning skills (quick reading - summary and writing notes - monitoring of customary growth - mental maps - preparation for testing)

Textbook:

Basic References : learning, thinking, and research skills ,1439 H- 2018 ,fifth edition, Education Experts Center –Riyadh.

Other references:

●Alamiri , Ahmed (2005) Art of thinking . Riyadh , Alabaikan .

●Mohammed Hussain Goody (2013) creative thinking development for students . cairo , academic book center .

●Abduljabar Saeed Hussain(2016) . Scientific research principals , cairo

●Anwar Riyadh Abdulraheem (2008)Learning and retrospect skill. Oman

●Noha Abu-gomah (2015) Introduction to Scamper program for creative thinking development . Oman .

140TEC-2   Computer Skills 1   2 (2 , 0 , 0)

●Providing students with basic knowledge of Information Technology, internet, E-learning and its related terminologies.

●Giving students the ability to deal with the modern operating systems, office software, and E-Learning resources to express ideas and communicate with others by using computer-based technologies.

●Developing students' scientific and research skills.

Course Description:

This course introduces computer concepts, including fundamental functions and operations of the computer using Microsoft Windows and Office Suite applications. This course also covers PC history, hardware, software, operating concepts. In addition this course includes internet and E-Learning concepts.

Textbook:

إعداد وحدة مهارات الحاسب الآلي بكلية الحاسبات وتقنية المعلومات، جامعة " Skills Computer " مهارات الحاسب الآلي الملك عبد العزيز، الطبعة السابعة، خوارزم العلمية للنشر والتوزيع، 1439هـ2018م، فهرسة مكتبة الملك فهد الوطنية.

Other references:

●Microsoft Office (latest version) from Internet

● 2007 أ.د. عبدالله بن عبدالعزيز الموسى "مقدمة في الحاسب والانترنت"، المملكة ـ العربية السعودية، الطبعة الخامسة 1428هـ.

●University of Cambridge International Examination, أوراق العمل باستخدام مايكروسوفت اكسل version 6.2,gtslearning,London,SW64LZ,United Kingdom,2013

●University of Cambridge International Examination, معالجة النصوص باستخدام مايكروسوفت وورد version 6.2,gtslearning,London,SW64LZ,United Kingdom,2013

●University of Cambridge International Examination, العروض مايكروسوفت باستخدام version التقديمية 6.2,gtslearning,London,SW64LZ,United Kingdom,2013 باوربوينت

●University of Cambridge International Examination, استخدام version الكمبيوتر وادارة الملفات باستخدام 6.2 ويندوز مايكروسوفت,gtslearning,London,SW64LZ,United Kingdom,2013 - University of Cambridge International Examination, المعلومات والاتصالات version 6.2,gtslearning,London,SW64LZ,United

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Kingdom,2013

●University of Cambridge International Examination, مقدمة في تقنية المعلومات version
6.2,gtslearning,London,SW64LZ,United Kingdom,2013

141ENG-2   Writing Skills   2 (2 , 0 , 0)

The aim of this course is to develop the students' writing skills for a variety of purposes.

Course Description:

The course is designed to introduce learners into basic writing skills which will prepare them for academic writings as well as an adept user of English language. Students will be encouraged to explore different writing sources from online IT sources. Students can also benefit from the e-learning materials uploaded on the blackboard system, remedial classes, and from the virtual classes as well.

Textbook:

WRITING POWER 1 - PEARSON

Other references:

Internet Sites; YouTube

142ENG-2   Listening & Speaking   2 (2 , 0 , 0)

Objective:

This main purpose of this course is to focus on developing listening and speaking skills as well as critical thinking/listening skills, vocabulary, and pronunciation.

Course Description:

This course (i.e. Northstar 1 Listening and Speaking 3rd edition (GCC)) helps students develop their English listening and speaking skills and enables them to succeed in college level courses and to achieve their academic as well as language and personal goals in order to meet the challenges of the 21st century. The course engages and motivates students to listen to new, short, updated contemporary, authentic discourse with a view of demonstrating understanding. The course also emphasizes development of academic discussion through pre-listening activities, and develops comprehension skills through post-listening activates, with a focus on identifying main ideas and details and on pronunciation, intonation, stress patterns; and on vocabulary through using the same creatively in similar contexts. In addition, it develops critical thinking/listening skills through activities that engage students in logical thinking: predicting information and making inferences. The course also encourages the use of English communicatively through academic discussion as well as through task-based learning; and to improve speaking fluency skills with careful attention to pronunciation elements, students participate in more communicative oral activities such as discussions, pair and group work, role playing, interviews, etc.

Textbook:

Northstar 1: Listening & Speaking 3rd edition (GCC), by Polly Merdinger and Laurie Barton.

Other references:

Oxford Advanced Learner's Dictionary – A. S. Hornby

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143ENG-2   Grammar   **2 (2 , 0 , 0)**

Objective:

The objective of the course is to help students achieve a maximum knowledge of English grammar (grammatical competence) towards promoting the communicative competence of the students to meet the needs at the college level.

Course Description:

This course provides students with the basic elements of English sentences including parts of speech, word order, verb tenses, comparatives, gerunds and infinitives and sentence structures. The course is well-sequenced: starting with simple and basic rules of English grammar to constructing accurate, complex sentences. The course engages and motivates students to acquire native-like grammatical competence towards more comprehension and mastering of English. In addition, the course also prompts students to use the grammar in activities that encourage effective communication and cultivate critical thinking.

Textbook:

Interactions 1 Grammar, Diamond Edition, 2012, by Elaine Kirn & Darcy Jack

Other references:

●http://www.paradigmdev.eu/mosiac_fog/index.html

●Oxford Advanced Learner's Dictionary – A. S. Hornby

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———————————————— **Courses of level 2** ————————————————

145TEC-1   Computer Skills II   1 (2 , 0 , 0)

Objective:

The purpose of this course is to:

1.Solve problems in computers according to problem solving steps
2.Develop algorithms using sequential and decision logic structures.
3.Develop algorithms using various loop logic structures.
4.Transcribe the algorithm in pseudocode language.
5.Test the solution of the pseudocode language.

Course Description:

This course introduces the student to concepts of problem solving using constructs of logic inherent in computer programming languages. Students apply problem solving concepts by analyzing problems and constructing, testing, and implementing algorithms using pseudocode. Topics include: program flowchart, control structures, and programming fundamentals.

Textbook:

"Computer Skills2", Collected lectures by Computer Skills Department, Preparatory Year Deanship, 2018.

Other references:

-Maureen Sprankle and Jim Hubbard, Problem solving & programming Concepts ,9th Edition , 2011
-Jones and Bartlett, Problem Solving Basics and Computer Programming, A programming language independent companion to Roberge/Bauer/Smith, "Engaged Learning for Programming in C++: A Laboratory Course", Publishers, 2nd Edition, ©2001, ISBN 0763714232, By Ronald A. PaskoFor CS397-Special Problems, Spring 2002.

150MATH-4   Differentiation Calculus 1   4 (4 , 0 , 0)

Objective:

Students are expected to have strong and sound understanding of the differentiation calculus in term of its concepts, techniques and theorems. Students are expected to apply them on studying the behavior of a function.

Course Description:

This course is designed to cover the Differential Calculus. It includes limits, continuity, derivatives, and the applications of derivatives. The types of functions studied include algebraic, trigonometric, exponential and logarithmic.

Textbook:

Differentiation Calculus, Ibraheem Alolyan, et al , The King Saud University, 3rd Edition Year: 2018.

Other references:

●Anton, H; Bivens, I & Davis, S. Calculus Early Transcendentals, Ninth Edition, Wily & Sons, 2009.

Thomas, Calculus, Pearson Education , Addison Wesley, 2004.

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150ENG-3   General English   3 (3 , 0 , 0)

Objective:

By the end of the course, students will be able to:

●read various kinds of texts (interviews, reports, magazines articles etc. to practice strategies such as inference, scanning, skimming and identifying functional and notional elements;

●compose grammatically correct sentences, write a paragraph with an effective topic sentence and supportive details;

●use words and grammar appropriately in order to render correct nuances;

●effectively and appropriately use conventional devices such as 'so' and 'right'

●initiate, continue and end conversations in novel and varies situations.

●listen to understand main points and note down detailed information.

Course Description:

The course has several units which are based on particular themes. Each unit incorporates different tasks and activities in all the four skills, namely Reading, Writing, Listening & Speaking and Grammar with occasional explanations of vocabulary items. Students will practice using English communicatively in speech and writing. They will also listen to tape scripts for detailed information and for inference. They are expected to use newly acquired language in unrehearsed situations. The emphasis is on familiarizing students with the nuances of language use in daily affairs and on giving them learning experiences that will help them perform in real-life situations.

150MAN-1   Professional Ethics   1 (1 , 0 , 0)

Objective:

Knowledge of the concepts of professional ethics and practices in working life.

Course Description:

The Ethics course consists of four chapters: -

●The first chapter is called (basic concepts)

●Chapter II is called ethics of the profession from the perspective of Islam,

●Chapter III is called non-virtuous ethics in the job

●Chapter IV is called the ethics of the profession in the Saudi regimes.

Textbook:

Ethics of the profession. (1439 AH / 2018 AD). Fifth Edition. Education Experts Center. Riyadh

Other references:

-Al-Humaidan , Essam (1427). Professional ethics in Islam and its applications in the systems of Saudi Arabia. Dar Al Obeikan Publishing. Riyadh.

- Al-'Uthaymeen, Muhammad ibn Saleh (1428). Makarem Ethics, a series of works of Sheikh Sheikh (68). Dar Al Watan Publishing House. Riyadh.

-Al-Zaidi, Abdul-Jabbar (1424): Professional Ethics in Islam, University of Sharjah, i.

-Abdelkader, Mohamed Ahmed (2003). Of ethics issues in Islamic thought. Dar Al Maarefah University, Egypt.

-Aqel, Mahmoud Atta (1426). Professional values. Arab Bureau of Education for the Gulf States. Riyadh.

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150SKL-2   Communication Skills   2 (2 , 0 , 0)

Objective:
Development of some communication skills among students.
Course Description:
This course aims to develop communication skills for level two students

Textbook:
Communication Skills-1439/1440 H – 2018/2019 G. Third edition. Education Experts Center – Riyadh

Other references:
1.Almasaudi , Saad (2007) Communication Skills , King Abdulaziz University-Jeddah
2.Aljayousi , Mohammed Bilal (2002) You and Me , an introduction in human communication skills , Arab bureau of education for gulf states , Riyadh .
3.Salam , Aza Mohammed (2007) communication skills , the center for advancement of post-graduate studies and research , Cairo

151ENG-2   Technical Report Writing   2 (2 , 0 , 0)

Objective:
The course will enable students to:
● correct their mistakes in formal writing
● understand the formal English and its syntax
● write better in technical and professional context
● practice different types of formal writing
● undertake formal communication
● collaborate with class fellows and outsiders
● do initial research (related to their academic needs)
● write research reports
● meet future challenges

Course Description:
The course brushes up the knowledge and skill of the students in writing. It furthers their competence level in formal writing and gives students introduction to formal writing tasks. It also prepares them for practical, professional and academic life ahead. The course aims to inspire students to research the subject matter and encourages them to work in team.

Textbook:
The Faculty Developed Book and Material
Other references:
English-Arabic Dictionary, The Faculty Developed Book and Material.

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——————————————— **Courses of level 3** ———————————————

101CHM-3   General Chemistry   3 (3 , 0 , 0)

Objective:

-The basic objectives of this course are to learn about chemical calculations, gas laws, substance states, types of solutions, and chemical equilibrium.

-Describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field)

-Mention to prepare an essay or a report from literature using the library, data base services, and/or websites to follow up and update the new topics of the subject of the course

Course Description:

Learn about chemical calculations, gas laws, substance states, types of solutions and chemical equilibrium, physical meanings of mathematical equations and how to apply them in life to benefit from them, basic principles of thermochemistry, and the principles and rules of safety in laboratories.

Pre –requisite (if any): Completion of Preparatory year

Textbook:

General Chemistry, by Dr. Ahmed Al Owais, Prof. Sulaiman AlKhowaiter, Dr. Abdulaziz Al-Wasel, Prof. Dr. Abdulaziz AlSuhaibani, Publisher: Dar Al Khraiji Publishing and Distribution, 1425 edition

Other references:

General Chemistry - Principles and Structure - Part 1 - Fifth Edition - by James Brady and Gerard Humston Translated by Suleiman Saasa and Mamoun Halabi New York, 2nd edition, 1985

104GE-4   Principles of General Physics   4 (3 , 2 , 0)

Objective:

To educate core part of Physics in particular the laws such as Newton's Laws, Coulomb's Law, Ohm's Law, Kirchhoff's Law etc and the principles of physics. Introducing this course basically to motivate the students towards the understanding of mechanisms in the field of Kinematics, Dynamics, Waves, Oscillations, Charges, Electricity and Magnetism. In addition to it, solving the numerical problems and answering the reason based questions are working as a tool for the brainstorming of the student.

Course Description:

This course is devoted to educate the students with basic principles and concepts of physics.

Pre –requisite (if any): Completion of Preparatory year

Textbook:

Serway and Ramond, Physics of Scientists and Engineers, Sunders College Publication

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106MATH-3   Introduction to Integration   3 (3 , 0 , 0)

Objective:

The main objectives of the course is to familiarize the students with the essential concepts and evaluate the integrals

Course Description:

●Approximate area and Riemann Sums , Definite integrals and their properties, Main value theorem for definite integrals, Anti derivatives and indefinite integrals, Fundamental theorems of Calculus

●Integrals of exponential, Logarithmic, Trigonometric and Hyperbolic functions, Integral involving the inverse of trigonometric and Hyperbolic functions

●Integration techniques as integration by parts, Trigonometric integrals, Trigonometric substitution, Integrals involving roots, Integrals involving quadratic functions, Integrals involving
rational functions (Partial fractions), Different substitutions and Improper integrals
●Numerical integration: Trapezoidal rule and Simpson rule.
●Application of the definite integrals: Arc length, Areas, Volumes and Moment and center of Mass

Pre –requisite (if any): Non

Textbook:
Earl W. Swokowski: Calculus : The Classic Edition

107MATH-3   Algebra and Analytical Geometry   3 (3 , 0 , 0)

Objective:
●Understanding types of matrices and basic concepts of matrices and operations on them.
●Solving linear systems and computing determinants of matrices and the properties of determinants.
●Select and applying the concepts of vectors (in the plane and space) in different situations such as geometric drawing.
●Know the general formulas for the equations of line, circle and perpendicular distance function from a point to a line. Recognize between different formulas of conic sections and understand rectangular, polar coordinates and curves in polar coordinates.
●Know the equations of line and plane in space. Illustrate the need of differential equations in our practical life.
Course Description:

This course introduce the types of matrices and basic concepts of matrices and operations on them. Solving linear systems and computing determinants of matrices and the properties of determinants. Select and applying the concepts of vectors (in the plane and space) in different situations such as geometric drawing. Know the general formulas for the equations of line, circle and perpendicular distance function from a point to a line. Recognize between different formulas of conic sections and understand rectangular, polar coordinates and curves in polar coordinates. Finally, know the

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equations of line and plane in space.
Pre –requisite (if any): Non

Textbook:
Earl D. Rainville, Phillip E. Bedient , Elementary Differential Equations (Seventh Edition) , Macmillan Publishing Company

Other references:
● Elementary Linear Algebra, Bernard Kolman, Macmilan Publshing Inc.
● Calculus with analytical geometry, Howard Anton, John Wiley and Sons.

107ENG-3   Technical Writing   **3 (3 , 0 , 0)**
Objective:
Course Description:
This course will enable the student to improve his ability to write expository essays. The course topics include Investigation of topic-selection processes, development of thesis statements, outlining as it relates to support for a selected thesis statement, both in sentence and slug-style, and practice and emphasis on critical thinking skills.
Pre –requisite (if any): Completion of Preparatory year
Textbook:
Other references:

111ISL-2 Introduction to Islamic Culture 1   **2 (2, 0, 0)**
Objectives:
1. التعريف بمعنى الثقافة ومصادرها وأهمية دراستها.
2. بيان الخصائص العامة للإسلام.
3. تقرير العقيدة الصحيحة المستمدة من الكتاب والسنة وترسيخها في نفوس الطلاب .
4. تعريف الطلاب بأصول الإيمان ودراستها في ضوء منهج السلف الصالح .
5. بيان نواقض الإيمان وما ينافي كماله الواجب وكيفية الوقاية منها .
6. خطورة التكفير وضوابطه .
Course Description:
يهدف المقرر بصورة عامة إلى التعريف بالثقافة الإسلامية وبيان أهميتها ومصادر تحصيلها، وترسيخ أصول العقيدة الصحيحة في نفوس الطلاب، وتعريفهم بأصول الإيمان وخصائص الإسلام على منهج السلف الصالح، ثم التحذير من نواقض الإيمان، ومن التكفير بغير ضابط أو دليل.
Textbooks:
أصول في الثقافة الإسلامية ، د. محمد بن أحمد الخريصي وآخرون.
Other references:
كتب الثقافة الإسلامية عمومًا

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———————————— **Courses of level 4** ————————————

112ISL-2   Introduction to Islamic Culture 2   **2 (2 , 0 , 0)**

Objective:

1.إبراز خصائص المجتمع الإسلامي والأسس التي يقوم عليها، ووسائل الترابط الاجتماعي، وأهم المشكلات الموجودة في المجتمع.
2-تجسيد تعاليم الإسلام في مجال تكوين الأسرة وإظهار دور المرأة في بناء الأسرة وتشكيل المجتمع .
3-بيان هدي الإسلام وتوجيهاته في قضايا الزواج وتربية الأولاد، الأمر الذي يساعد على حفظ كيان الأسرة واستقرارها، وبالتالي ترابط المجتمع وتقويته .
4-معالجة الإسلام لما يحدث في نطاق الأسرة من قضايا ومشكلات .

Course Description:

يهدف المقرر بصورة عامة إلى التعريف بأسس المجتمع الإسلامي وبيان خصائصه ووسائل تقوية روابطه، ثم التعرف على أهم المشاكل والقضايا الاجتماعية والأسرية وكيفية معالجتها.

Textbook:

الإسلام وبناء المجتمع، للدكتور حسن عبد الغني وآخرين

105PHIS-4   Advanced Physics   **4 (3 , 2 , 0)**

Objective:

To educate core part of Physics, in particular the laws such as Ohm's Law, Kirchhoff's Law, Hook's Law, Laws of Thermodynamics, etc. Introducing this course is basically to motivate the students for the detailed understanding of the mechanisms of atomic and crystal structures of material and their electrical, magnetic, thermal and mechanical behavior. In addition to it, solving the numerical problems and answering the reason based questions are working as a tool for the brainstorming of the student.

Course Description:

This course is devoted to educate the students with the advanced level learning outcomes and concepts of physics.

Pre –requisite (if any): 104PHIS-4

Textbook:

Serway and Ramond, Physics of Scientists and Engineers, Sunders College Publication
Other references:

108ENG-2   Communication Skills for Engineers   **2 (2 , 0 , 0)**

Objective:

Course Description:

The use of good English: gather ideas and information, to organize ideas relevantly and coherently; engage in debates; participate in group discussions; face interviews; present scientific seminars; make oral presentations; transfer information from non-verbal to verbal texts and vice versa; take part in social and professional communication

Pre –requisite (if any): Non

Textbook:

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Arab 201-2   Language Skills 2   مهارات لغوية   **(2 , 0 , 0)**

Objective:

أن يتجنـب الطـلاب ا لأخطـاء النحوية واللغوية والأخطـاء الشـائعة, في الحديث والكتابة، وأن يتمكنوا من اختيار مفرداتهم بعناية ودقة

Course Description:

يتنـاول المقرر كـل مـا يمكن الطالب مـن التعبيـر السليم كتابيـا بحيـث يكـون خاليـا مـن الأخطـاء الإملائيـة والأسلوبية وبعيدا عن الأخطاء الشائعة.

Textbook:

ضو، عبد الفتاح فرح (2009). المهارات اللغوية، مكتبة الرشد، الرياض.

Other references:

-النحو الواضح في قواعد اللغة العربية، علي الجارم ، مصطفى أمين ، دار المعارف ،مصر
-المعجم العربي، د. رياض زكى القاسم، دار المعرفة، بيروت .
-معجم الأخطاء الشائعة، محمد العدناني، مكتبة لبنان، ط2، 1980م .
-جـامع الـدروس العربيـة، مصـطفى الغلايني، مؤسسة الرسالة، بيروت، ط1، 2008
-معجم الأغلاط اللغوية المعاصرة، محمد العدناني، مكتبة لبنان، ط1، 1984
-التطبيق الصرفي. د. عبده الراجحي, دار المسيرة ، عمان ،ط1 ، 2008م

101GE-3   STATICS   **3 (3 , 0 , 1)**

Objective:

1. Define and calculate magnitude and direction of forces and moments.
2. Draw free-body diagrams for two- and three-dimensional force systems and analyze frame and truss structures.
3. Calculate forces and moments acting internally or externally on an object.
4. Determine the location of the centroid and the center of mass for a system.
5. Calculate area moment of inertia for engineering cross sections.
6. Solve simple statics engineering problems, including friction related equilibrium problems.

Course Description:

Analysis of force systems and vectors (2) free-body diagrams and equilibrium of particles and rigid bodies, (3) structural analysis of internal and external forces of trusses and frames, (4) principles and application of friction; (5) centroids and centers of gravity, and (6) area moments of inertia.

Pre –requisite (if any): 107MATH-3   + 104PHIS-4

Textbook:

STATICS, JL Meriam & LG Kraige Published John Wiley & Sons, Sixth (in SI Units)

Other references:

● Engineering Mechanics Statics (13th Edition) - by R. C. Hibbeler   Published by Pearson 2013.
● Vector mechanics statice by Beer and Johnson, Published by Mc Graw Hill

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203MATH-3   Advanced Calculus   3 (3 , 0 , 0)

Objective:
The main objectives of the course is to familiarize the students with the essential concepts and the solutions of partial derivatives and multiple integrals.

Course Description:
This Course will Cover Series .Partial Derivatives, Multiple Integrals and its Applications.

Pre –requisite (if any): 106MATH-3

Textbook:
  Nassar Hassan Alsilmy, Calculus III, Part III 2005, Alrushd
Other references:
Earl W. Swokowski: Calculus : The Classic Edition

306 GE-2 Engineering Economy   2 (2, 0, 1)

Course Objectives:
Students should learn basic science and procedures in the field of engineering economics and evaluation of projects merits.

Course Description:
Introduction to Engineering economy. Interest formulas and equivalence. Bases for comparison of alternatives. Decision making among alternatives. Evaluating replacement alternatives. Break even and minimum cost analysis. Cost accounting. Depreciation. Economic analysis of operations. Economic analysis of public projects. Basic management process approach, strategies and planning methods, project planning and scheduling, Bar chart, critical path methods, PERT method, resource leveling and allocation, time cost trade off. Construction and organizational approaches, leadership elements and decision making, computer applications

Prerequisite: Non

Text Book:
"Engineering economy by W.G.Sullivan, E.M. wicks, and J.T.Luxhoj
Other references:
Lectures hands-out and materials available online in the blackboard.

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———————————— Courses of level 5 ————————————

241CE-3   Strength of Materials   3 (3 , 0 , 1)
Objective:

1. Define basic terms of strength of materials: stress, strain and Hooke´s law.
2. Determine displacements and stresses for axial loads.
3. Calculate shear stresses due to torsion and design of circular shafts.
4. Analyze and design of beams for bending stresses.
5. **Explain buckling of columns and stability for different types of support.**

.

Course Description:
This course is an introductory course to the field of structural engineering and it aims to introduce students to the concepts of Mechanics of deformable body. Students are expected to gain a knowledge in the stress for different cases of loads, strain, Hook's law and statically determination of axial force, shear force and bending moment in bars, beams and shafts.
Specific topics covered include: Normal stress and strain; Hooke´s law for axial loads; Shear stress and shear strain; Torsional deformation; pure bending of beams; Transformation of stress; Deflection of beam; and column buckling.

Pre –requisite (if any): 101GE-3- Statics
Text Book:
Mechanics of Materials – 10th Edition - R.C. Hibbeler- Pearson– 2016- ISBN-13: 978-0134321189

204MATH-3   Differential Equations   4 (3, 0, 0)
Objectives:
●Inform the students of certain type of Differential equations.
●Illustrate the need of differential equations in our practical life.
●Training the students for finding the solutions of Differential equations.

Course Description:
This course is an introduction to the study of ordinary differential equations. In this course, the definition, classification and different methods of solution are presented. Some physical, engineering, chemical, biological and other applications are also studied.
Pre –requisite (if any): 106MATH
Textbooks:
Earl D. Rainville, Phillip E. Bedient , Elementary Differential   Equations (Seventh Edition) , Macmillan Publishing Company
Other references:
1.Elementary Differential Equations Boundary value problem ,8th Edition ,with ODArhitect CDWilliamE.Boyce ,Richard C.Diprima.
2. Frank Ayres , Differential Equations , theories and problem , McGraw- Hill , New York, 1990

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3.Jeffrey R .Chasnov , Introduction to Differential Equatios , The Hong Kong University of Science And Technology , Department of Mathematics , Hong Kong , 2009

204 GE-3   Computer Programming for Engineers   3 (2 , 2 , 0)
Objective:
1.Understand the basic computer programming concepts.
2.Programming some examples with C language
Course Description:
Computer Algorithms; Developing Algorithms; Programming Preliminaries; Simple computer Programs; Numeric Constants and Variables; Arithmetic Expressions; Input and Output in C Programs; Conditional statements; Implementing loops in Programs; Defining and Manipulation Arrays; Logical Expressions and More Control statements; C Programs Examples; Functions; Enumerated data Type and stacks; Structures; Pointer Data Type and its Applications; Lists and Trees; Recursion; Bit level Operations and Applications; Files in C; Miscellaneous Features of C.
Text Book:
"Computer Programming in C," by V. RAJARAMAN Eastern Economy Edition.
Other references:
"Problem Solving and Program Design in C," Jeri R. Hanly & Elliot B. Koffman, Seventh Ed., Pearson, 2013 Other supplemental materials "C "How to Program," P. J. Deitel & H. M. Deitel, Sixth Ed., Pearson, 2010

261CE-3 Surveying Engineering   3 (2 , 2 , 1)
Objectives:
1.Introduction, definitions, surveying types and measuring units.
2.Linear measurements (Tape, Electronic distance measurement, angular measurements).
3.Levels and leveling operation; contorting and cross-sections and volume; area computations.
Introduction to Total Stations; traverses; data collection and setting out.
Course Description:
The basic surveying theory and practice Principles of measurements of distances, elevation and angles. Basic error theory in measurement and calculations. Topographic surveying and mapping; Area and volume computations; Circular curves.
Text Book:
 Paul, R. Wolf & Charles D. Ghilani, " Elementary Surveying: An Introduction to Geomatics 15th Edition " Pearson; 15th edition (January 24, 2017).

203GE-3   Engineering Drawing   3 (2 , 2 , 0)
Objective:
1.Mastering the use of various technical drawing tools to produce high quality and neat drawings.
2.Developing the students' skills in producing professional engineering drawings to present their design ideas.
3.Increasing the students' imaginary design thinking and expanding their design visual language

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proficiency.

4.Learn the principle of using AutoCAD package in the drawing.

Course Description:

Introduction to Engineering Drawing & its course specification. - Engineering drawing instruments & their properties. - Applied geometry. - Orthographic projections (Basic views, applied dimensions & lettering, vertical sections), Orthographic projections (missing views) - Pictorial drawings (Isometric and Oblique) - Introduction to Engineering Drawing using AutoCAD (Draw and Modify Commands) - Engineering Drawing using AutoCAD (Layers, Dimensioning, Zooming and Printing Commands) -

Text Book:

1.Cecil H. Jensen; Jay D. Helsel; Dennis R. Short, Engineering Drawing & Design (2007), 7th Edition, McGraw Hill, Science Engineering.

2.K. Venugopal, Engineering Drawing & Graphics, New Age International, 2007

205GE-3   Dynamics   3 (3 , 0 , 1)

Objective:

1. Differentiate between different geometric aspects of the motion of a particle.

2. Investigate the rectilinear and curvilinear motion for a particle.

3. Describe projectile motion as an application for curvilinear motion.

4. Draw free body diagrams and perform kinetic analysis.

5. Develop the work and energy principles of forces and moments

6. Apply principles of impulse and momentum for a particle.

7. Analyze the mechanics of impact.

Course Description:

This course aims to introduce students to the concepts of dynamics. Students are expected to gain a knowledge in the dynamic analysis for both particles and rigid bodies. This course introduces kinematics of Particles, Newton's law of motion, the principle of work and energy, and the principle of impulse and momentum.

Specific topics covered include: rectilinear and curvilinear motion of a particle; force, acceleration; work, potential, and kinetic energy; impulse and momentum; general planar rigid body kinematics.

Pre –requisite (if any): GE101

Text Book:

●Engineering Mechanics: Dynamics - 13th Edition - R. C. Hibbeler -
Pearson Prentice Hall – 2012- ISBN 13: 978-0132911276

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──────────────── **Courses of level 6** ────────────────

113ISL-2 Islamic Culture III   **2 (2, 0, 0)**

Objectives:
1. ـ التعرف على مفهوم الحقوق في الشريعة الإسلامية، وتعدد أنواعها.
2. ـ التعرف على أهم الحقوق العقائدية، وهو حق الله تعالى، وحق الرسول صلى الله عليه وسلم.
3. ـ دراسة مجموعة من الحقوق الأخرى المهمة، مثل: حق آل البيت والصحابة رضي الله عنهم، وحق الراعي والرعية، وحق الوالدين، وكذلك حق المعاهدين والمستأمنين والعمال والمستخدمين، ثم دراسة حق البيئة في الإسلام.
4. ـ التعرف على كيفية تطبيق هذه الحقوق في الواقع العملي.
Course Description:
أن يتعرف الطالب على الحقوق الواجبة عليه في الشريعة الإسلامية، وكيفية تطبيق ذلك في حياته اليومية.
Textbooks:
مذكرة (الحقوق في الإسلام) لمجموعة أساتذة من الكلية
Other references:
1.موسوعة حقوق الإنسان في الإسلام للدكتور عدنان الوزان.
2.موسوعة حقوق الإنسان في الإسلام للدكتورة خديجة النبراوي.

CE 211-3   Fluid Mechanics   **3 (2, 2, 1)**
Objective:
By the completion of the course, the students should be able to:
1-Apply the basics of fluid mechanics
2-Know fluid characteristics in static and dynamic states and the stability of floating bodies
3-Know the basic of fluid energy.
Course Description:
Introduction and basic concepts of fluid mechanics, fluid properties, pressure and fluid statics in immersed surfaces, stability of floating bodies, fluid kinematic, energy equation, momentum equation, flow measurements, and dimensional analysis.
Laboratory experiments covering (fluid properties, hydrostatic Principles, pressure measurements, demonstration of Bernoulli's theorem, loss of head in pipe, Flow rate measurements using Venturi meter, , Centre of pressure on partially and fully submerged bodies, Flow over a weir and discharge through orifice.)
Text Book:
-Joseph B. Franzini, E. John Finnemore, Fluid Mechanics with Engineering Applications, (2001). Tenth edition, McGraw-Hill.
-Bruce. R. Munson, Donald. F. Young, Theodore. H. Okiishi, and Wade. W. Huebsch. (2009). Fundamentals of Fluid Mechanics, six Edition, John wiley & Sons, Inc.

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References
Yunus. A. Cengel and John M. Cimbala (2006), "FLUID MECHANICS: Fundamentals and Applications", Published by McGraw-Hill.

324STAT-3 Probability and Engineering Statistics   3 (3, 0, 0)

Objectives:
The main objective is knowledge of the basic concepts related to the principles of statistics, probability and random variables theory with the transfer of student from the stage of description to the stage of decision-making and problems solving.

Course Description:
This course introduce: Importance of statistics, Presentation and description of statistical data, Measures of central tendency, Measures of dispersion, Variation coefficient, Measures of skewness, Kurtosis Measure, Correlation and regression, Introduction of probability , Random Variables , Probability functions and some significant probability distributions.

Textbooks:
Richard j. and Gouri B. , Statistics Principles and Methods., JOHN WILE , SONS, 1985.
Other references:
1.R.E Walpole, R.H. Myers, probability and statistics for engineers and scientists ,Macmillan publishing 1998.
2.Mendenhall and Tsincich , statistics for engineers and scientists , prentice Hall , Fourth Edition , 1995.

CE 221-2 Geology for engineers   2 (2, 0, 1)

Objectives:
The main purposes for this course are to:
1.Demonstrate the concepts and principals of Engineering Geology.
2.Explain the main differences between the role of each of engineering geologist, civil engineer, and geologist individually.
3.Classify earthen materials (soils & rocks) from an engineering geological view.
4.Predict geotechnical problems of a given soil/rock mass and its best available methods of improvement and stabilization.
5.Identify the essential and the important role that groundwater existence plays on civil engineering projects.
6.Demonstrate site investigation principles for engineering purposes.
7.Integrate theoretical aspects of engineering geology and its applications for civil engineering purposes.

Course Description:
This course basically focuses on the main concepts and principles of the engineering geology as well as civil engineering terms and considerations. Moreover, this course is designed to provide students with a strong foundation for engineering properties of earth materials as well as the engineering role that groundwater existence plays especially for problem soils and landslides. A base ground on some engineering geology applications will be built for students.

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Pre –requisite (if any): Strength of Materials (241CE-3)
Textbooks and Reference Materials:
▪Attewell, P.B. and Farmer,I.W, 1979: Principles of Engineering Geology, Jhon Wiley & Sons.
▪Rahn,P.H, 1986: Engineering Geology, Elsevier science pub.co.
▪Goodman,R.E.,1976: Method of Geological Engineering, pub.co
▪Sowers,G.B.&Sowers,G.F.1970: Introductory Soil Mechanics and Foundation, The Macmillan Co.

251CE -3   Structural Analysis 1   **3 (3, 0 , 1)**
Objectives:
1.To understand the difference between determinate and indeterminate Structure.
2.To provide a thorough understanding and practical applications of structural analysis theories.
3.To develop the skills to analyze the behavior and response of structures to various loads and constraints of determinate structures.
Course Description:
Types of structures, structure elements, supports and loads. Idealization of structures and loads. Geometric stability and determinacy. Reaction computations of determinate structures. Reactions of cantilevered structures, three hinged arches. Shear force and bending moment diagrams for determinate structures (beams, frames and three hinged arches). Differential equation of elastic curve. Computation of rotation and deflections of beams by methods of double integration, moment-area, conjugate-beam, and virtual work. Influence lines of determinate structures (beams and trusses).
Prerequisite: CE 241-3
Text Book:
●Structural Analysis, 10th edition, 2017 Person Education, by R.C. Hibbeler. .

242CE-3 Concrete Technology: **3(3, 0 , 1)**
Objective:
-To define and understand concepts related Concrete technology which involves types and property of concrete and different adhesive materials and its vital use for safe, economic development for the buildings.
-To present the foundations of many basic Engineering tools and concepts related to Concrete technology and Civil Engineering.
-To give an experience in the implementation of engineering concepts which are applied in field of Civil Engineering.
Course Description:
Chemical composition of Portland cement. Structure of hydrated cement paste. Chemical and mineral admixtures. Properties of fresh concrete. Hot weather concreting and influence of curing. Durability of concrete. Quality of concrete and compliance with specifications. Field visits and group project.
Prerequisite: CE 241-3
Text Book: Mindess, J.F. Yound and Darwing, "Concrete", SI Ed.

202ARAB-2   Arabic Writing   **2 (2 , 0 , 0)**
Objective:

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Course Description:

اصطلاحا. أقسام الكلمة: اسم، وفعل. وحرف تعريف الكلمة: لغة، علامات الاسم :)ال (التعريف، التنوين، والحديث عنه. أقسام الاسم من حيث الإعراب والبناء :معرب، ومبني. أقسام الفعل : ماض، وأمر، ومضارع .العالمة التي يعرف بها كل فعل، وحكمه من حيث الإعراب والبناء .تعريف الكلمة. صور ائتلاف الكلمة ست .تعريف الإعراب، وبيان أنواعها، مع بيان ما يشترك فيه الاسم والفعل، وما يختص به كل واحد منهما، وبيان العالمات الأصول والفروع. مما خرج عن الأصل في إعرابه سبعة أبواب: خمسة في الأسماء الستة المثنى وما ألحق به جمع المذكر السالم وما ألحق به الجمع بالألف والتاء المزيدتين وما ألحق به في حالة النصب الممنوع من الصرف في حالة الجر. واثنان في الأفعال: الأفعال الخمسة الفعل المضارع المعتل الآخر في حالة الجزم. الصرف : الميزان الصرفي المجرد والمزيد- المعاجم : طريقة الكشف في المعاجم العربية المختلفة. الأدب والنصوص : من القرآن الكريم سورة الحجرات من أولها إلى آخر الآية رقم 22 من الحديث الشريف : خطبة الوداع، أو بعض الأحاديث المختارة ذات التوجيه الاجتماعي والسلوكي. من الشعر والنثر : مختارات شعرية ونثرية تمثل الأدب العربي .

Textbook:

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———————————— **Courses of level 7** ————————————

312CE-3   Hydraulics   3 (2 , 2 , 1)

Objectives:

1. Evaluation of friction and minor losses in closed conduits and analysis of flow in a single pipe and in pipes connected in series and in parallel Analysis of flow in a single pipe and in pipes connected in series and in parallel.

2. Learn basic elements of open channel sections and classify the flow in an open channel.

3. Analysis of critical and uniform flows in open channels and introduction to non-uniform flows and flow profile.

4. Classification and selection of pumps

Course Description:

Concepts of fluid flow through pipe, Characteristics of flow through pipes, energy losses, series piping, parallel piping, branching pipes, analysis of pipe flow networks, concept of flow in open channel, comparison between pipe flow and open channel flow, geometric properties of channel sections, specific energy and its application in open channel flow problem, uniform flow and its applications, hydraulic jump, gradually varied flow, hydraulic machines: pumps and turbines.

Text Book:

1- Fundamentals of Hydraulic Engineering Systems, Robert J. Houghtalen , A. Osman H. Akan and Ned H. C Hwang., Pearson Prentile Hall, 4th Edition,2010.

2- Open Channel Hydraulics, Ven-Te-Chow, McGraw-Hill Book Co.,2009

352CE-3 Reinforced Concrete1   3 (3 , 0 , 1)

Course Main Objective:

● To Recognizing the General principals of flexure analysis of reinforced concrete beam based on ACI code requirements.

● To recognize the concept and the modes of failure for beams under bending.

● To design reinforced concrete beams for singly and doubly reinforced members and "Flanged" beams.

● To design concrete beams for shear (diagonal tension)

● To compute development length of reinforcing steel.

● To understanding the need for compute crack control in reinforced concrete beams

● To design one-way solid slab.

● To understanding the reinforcement layout and detailing.

Course Description:

Fundamentals and design theories based on ultimate strength design and elastic concept using ACI code. ACI Code requirements. Load factors. Analysis and design of reinforced concrete members subject to flexure, shear and diagonal tension in accordance to ACI strength method. Analysis and design of reinforced concrete one way slabs . Development length of reinforcement, deflection and

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crack controls in reinforced concrete members.

Text Book:

1. Arthur H. Nilson, David Darwin, Charles W. Dolan, Design of concrete structures, McGrawHill, Last Edition.
2. ACI Committee 318, "ACI Standard, Building Code Requirements for Structural Concrete (ACI 318-14) and Commentary", American Concrete Institute, 2014.

322CE-4 Geotechnical Engineering   4 (3, 2, 1)

Objectives:

1) Know the formation and classification of soils.
2) Understand compaction of soils
3) Understand water flow through soils, flow nets and seepage.
4) Understand consolidation theory and settlement calculations of soils.
5) Understand basic concepts of shear strength of soils.
6) Determine lateral earth pressure.

Course Description:

Soil formation and identification; consistency limits and classification of soils; weight-volume relationships; soil compaction; effective stresses; permeability and seepage; compressibility and consolidation; stress in soils; shear strength of soils; introduction to lateral earth pressure and slop stability.

Text Book:

Principles of Geotechnical Engineering by Braja M. Das, 9th Edition

(CE 343-3) Properties and Testing of structural Materials,   3 (2 , 2 , 1)

Objectives:

1. Study properties, types, testing and test techniques of cement.
2. Understand the role of chemical and mineral admixtures in concrete technology.
3. Study the fresh properties of concrete.
4. Realize the role of water cement ratio on fresh and hardened properties of concrete.
5. Study types and mechanical properties of reinforcing steel.
6. Clarify the fresh and hardened properties of concrete

Course Description:

Methods of sieve analysis, density, absorption, and abrasion of sand and concrete aggregates. Normal consistency, setting times, compressive and tensile strengths of cements. Design and testing of concrete mixes for required workability, compressive, tensile, flexure strength and modulus of elasticity at various ages. Strength tests: on concrete cores, using Schmidt hummer and ultrasonic waves. Tensile test for reinforcing steel, and calculation of elastic modulus. Tests on isotropic and anisotropic materials and use of dial and electrical strain gages. Finding the Brinell Hardness Number of various materials. Tension tests on ductile and brittle materials. Nondestructive testing on concrete.

Recommended Textbooks and Reference Materials:

▪ Michael S Mamlouk, John Zaniewski, "Materials for Civil and Construction Engineers", Pearson Prentice, Last Edition.
▪ A.M. Neville, "Concrete Technology"

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353CE-3 Structural Analysis II   3 (3 , 0 , 1)

Course Objectives:
● To review the concept of the determinate and indeterminate Structure.
● To provide a thorough understanding and practical applications of structural analysis theories concerning composite and indeterminate Structure (classical and matrices theories).
● To develop the skills to analyze the behavior and response of structures to various loads and constraints conditions, such as support's settlements and sidesway in analysis of frames.
● To establish foundation knowledge and skills in preparation for structural design, concrete, steel, and coding computer programs that relate structural analysis and design.

Course Description:
Analysis of composite structures using Castigliano's theorems. Study of analysis of continuous beams and frames using classical methods, such as Slope Deflection Method and Moment Distribution Method, considering supports settlements in analysis of beams, and sidesway in analysis of frames; Study of analysis of trusses, continuous beams and frames using matrices method, such as Stiffness Method (standard and modified), considering sidesway in analysis of frames.

Prerequisite: 251CE -3 Structural Analysis I   4 (3 , 0 , 1)

Text Book:
1. Structural Analysis, 7th edition, 2009 Person Education South Asia Pte Ltd, by Russell C. Hibbeler.
2. Jack C. McCormac, "Structural Analysis", Harper & Row Publishers, Last Edition.
3. Kenneth Leet, Chia-Ming Uang, "Fundamentals of Structural Analysis", McGraw-Hill Professional, Last Edition.

114ISL-2 Islamic Culture IV 2 (2, 0, 0)

Objectives:
أن يتعرف الطالب على أهداف وثمرات دراسة السيرة النبوية المطهرة1 .
2. الوقوف على أهم أحداث حياة الرسول صلى الله عليه وسلم.
اكتساب القدرة على استنباط الدروس والعبر من تلك الأحداث 3.
التعرف على الجهود الكبيرة التي بذلها الصحابة رضي الله عنهم في خدمة هذا الدين العظيم4.
الاستفادة من كل ما سبق في الحياة العملية للطالب، وزيادة محبة الرسول صلى الله عليه وسلم والصحابة رضي الله عنهم5.

Course Description:
يهدف المقرر بصورة عامة إلى التعريف بأهمية دراسة السيرة النبوية وأثرها العظيم في زيادة الإيمان، وإمداد الطالب بالعبر والدروس المستفادة منها، فهي التطبيق العملي لفهم الإسلام فَهماً صحيحا .

Textbooks:
صحيح الأثر وجميل العِبَر من سيرة خير البشر، للدكتور محمد السلمي وآخرين

Other references:

كتب السيرة النبوية عمومًا

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———————————————— **Courses of level 8** ————————————————

313CE-2 Hydrology   2 (2 , 0 , 1)

Objective:
1. Gain a solid understanding of the basic principles of mathematics, science, and engineering.
2. Be able to apply this understanding to advance your technical competency in Civil and Hydrology.
3. Be able to use the techniques, skills, and modern engineering tools learned in this course for practice in Civil and Hydrology and/or graduate education.

Description:
The hydrologic cycle, Fundamentals of meteorology: Temperature, humidity, wind, Precipitation, Evaporation, Transpiration, and Infiltration, Stream flow and runoff, Stream flow hydrograph and Unit hydrograph, Groundwater flow, Types of aquifers and hydraulics of wells, Salt water intrusion in coastal aquifers.

Text Book:
Lineley, "Hydrology for Engineers", McGraw-Hill Book Co.
Todd, D. K. 1980. "Groundwater Hydrology", J. Wiley and Sons, New York.

371CE-3   Water Supply and Wastewater Systems   3 (2, 2, 1)

Objective:
1. Gain a solid understanding of the basic principles of mathematics, science, and engineering.
2. Be able to apply this understanding to advance your technical competency in Civil Engineering.
3. Be able to use the techniques, skills, and modern engineering tools learned in this course for practice in Civil and Sanitary Engineering and/or graduate education.

Description:
Introduction, Source of water supply, Water Demands, Quality of water supply and wastewater and drinking water standards, Design of Water treatment system (Sedimentation; and Coagulation-flocculation, Filtration, Disinfection, Softening, and Iron and manganese removal), Collection and Distribution of water, pipe networks, Characteristics of waste water and effluent standard , Design of Wastewater Treatment System. Wastewater collection networks & sewer system.

Text Book:
Husain, S.K. (2006).Textbook Of Water Supply And Sanitary Engineering, Publisher: Oxford & Ibh, 3rd Edition.

354CE-3 Reinforced Concrete II   3 (3, 0, 1)

Course Main Objectives:
Student learn the fundamental, techniques and theory of designing reinforced concrete structures and apply and use national and international codes such as ACI-318 & SBC Codes to design reinforced concrete members and structures such as beams, slabs, footings and columns.

Course Description:
Design of one-way, two-way, ribbed and flat slabs floor systems. Design for "torsion" and "combined shear and torsion" by the strength method. Design of continuous beams. ACI moment redistribution for minimum rotation capacity. Design of columns under axial and eccentric loadings, short and long columns, staircases, and types of concrete footings.

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Text Book:

1.Arthur H. Nilson, David Darwin, Charles W. Dolan, Design of concrete structures, McGrawHill, Last Edition.

2.ACI Committee 318, "Building Code Requirements for Structural Concrete (ACI 318M-14) and Commentary (ACI 318RM-14)", American Concrete Institute, Farmington Hills, MI.

3.Saudi Building Code and Commentary: SBC 304, SBC 301

331CE-3   Transportation and Traffic Engineering   3 (3 , 0 , 1)
Objective:

1. Identify basic concepts and stream components of traffic, traffic flow characteristics and transportation systems.

2.Compute highway capacity and travel demand.

3.Design intersections signalization.

4.Analyze and design traffic flow characteristics and parking facilities.

5.Apply modern techniques for transportation systems management.

Course Description: (Note: General description in the form used in Bulletin or handbook)

Transportation systems; vehicle characteristics and human reactions; traffic flow characteristics; highway capacity analysis; intersection control and design; public transportation; urban transportation planning; parking and terminal facilities; transportation safety; intelligent transportation systems and computer applications; introduction to railways, waterways, airports, and pipelines.

Textbook:

Transportation engineering- An Introduction C. Jotin Khisty and B kent Lall, 3rd Edition, prentice hall, 2003

Other references:

1.Traffic and highway Engineering, Nicholas Garber and lester Hoel, 2nd Edition, PWS Publishing Company, 1997.

2.Highway Capacity Manual, special report 209, Transportation Research Board, 2000 .

323CE-3, Foundation Engineering   3 (3, 0, 1)
Course Main Objectives:

By the completion of the course, the students should be able to:

●Plan for site investigation

●Recognize different types of Foundations.

●Determine the bearing capacity and settlement of shallow Foundations.

●Design shallow Foundations

●Determine the bearing capacity of deep foundations

●Design retaining walls

Course Description:

Site exploration and selection. Types of foundations. Bearing capacity and settlement of shallow foundations. Retaining Walls. Deep Foundations (single & group piles, piers and caissons

Text Book:

Braja M. Das , Latest edition   "Principles of Foundation Engineering", CL-Engineering, International Edition

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Reference:
Robert W. day, Latest edition ,"Foundation Engineering Handbook" McGraw Hill Companies, Inc.

254MATH-3, Numerical Methods   3 (3, 0, 0)

Course Main Objective:
The main objectives of the course is to familiarize the students with the essential concepts to Numerical methods and how to get the numerical solution of the equations

Course Description:
This course will cover the foundations of numerical methods . The main focus of this course is find numerical solution of (nonlinear equation, system of linear equation, interpolations and numerical differentiation and integration)

Text Book:
1.R. Burden, and J. D. Faires, Numerical Analysis, PWS-Kent Publishers, (1993).
– التحليل العددي ريتشارد بيردن ودوغلاس فايرس ترجمة محمد صبحي .

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————————————— **Courses of level 9** —————————————

352AMR-3   Electrical Systems & Building Circuits   **3 (3 , 0 , 0)**

Objective:
Course Description:
Textbook:
Other references:

481CE-3 Construction Engineering and Management: **3 (3, 0, 1)**

Objectives:
-Give an overview of basic construction management techniques and principles.
-To train the students with the latest and the best in the rapidly changing fields of Construction Engineering, Technology and Management.
-To prepare the students to be industry leaders who implement the best engineering and management practices and technologies in the construction industry.
-To continually work with industry to enhance the program's effectiveness and the opportunities for innovation in the construction industry.

Course Description:
An overview of construction industry; professional responsibilities, ethics, liabilities and licensing; contracts and project delivery systems; business ownership; project planning and scheduling; cost estimation, cost control, resource levelling, introduction to construction economics, equipment productivity and selection; construction productivity and safety; construction types, equipment, materials, and foundation; concrete form design; contemporary issues in Construction Engineering; field projects and life-long learning

Text Book:
-Construction Management: Daniel W. Halpin and Bolivar A. Senior, 5th Edition, Wiley, 2017
-Construction Methods and Management: S. W. Nunnaly, Prentice Hall.

432 CE-3   Highway Engineering   **3 (2 , 2 , 1)**

Objectives:
1-Identify types, classifications, cross sectional elements of highways, pavement materials and pavement distress.
2-Design the proper geometric elements of highways (sight distances, horizontal and vertical alignments and intersections).
3-Design surface and sub-surface drainage structures.
4-Design pavement structure (flexible and rigid).
5-Conduct experiments, analyze and interpret data.
6-Evaluate pavement structures.

Course Description:
Highway planning and capacity (design criteria and controls, cross sectional elements), Geometric alignment and design(sight distances, horizontal and vertical alignments, intersections), Surface and Sub-surface drainage, Lab. Experiments on pavement materials, Highway pavement materials and structural design of pavement thickness, Pavement Maintenance.

Text Book:
1-P. H. Wright & Karen K. Dixon, "Highway Engineering", John Wiley and Sons.

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2-Highway Engineering, 7th Edition, (2004), by Paul H. Wright & Karen Dixon.
Nicholas J. Garber, Lester A. Hoel, "Traffic and Highway Engineering", Brooks/Cole, Last Edition.

455CE-3 Steel Structures   3 (3, 0, 1)

Course Main Objectives:
● Understand the advantages and disadvantages of steel Structures.
● Understand the main concept of LRFD and ASD approach, and the related factors that affect the design.
● Understand the design of critical sections within the constraints of code design, criteria of safety, serviceability and economy using fundamental principles as well as design aids
● Work out all stages involved in designing different elements in typical steel structures, and to present the work involved in a professional way.
● Continue to follow up any developments and changes that occur to the related codes.

Course Description:
Introduction to steel structures design, methods of design, specifications, codes and loads. Design of tension and compression members, Design of beams, column under eccentric loadings, Design of Connections.

Prerequisite: CE 353-3

Text Book:
Jack McCormac, Stephen F. Casernac, "Structural Steel Design" Prentic Hall, Last edition.

491CE-2   Graduation Project 1   2 (1, 2 , 0)

Objective:
By the completion of the course, the students should be able to:
● To independently work on students' initiative.
● Identify the stages of project preparation and information
● To enthusiastically explore one or more areas of their program in depth.
● To thoroughly gather and manage information in a scientifically rigorous method.
● Develop a project plan and collect the necessary data and information with him
● To competently process and integrate materials in a sustained exercise of intellectual ordering.
● To skillfully produce coherent, literate official documents.
● To constructively appreciate and incessantly involved in life-long learning.
● To initiate students their path of success in the future industrial careers.

Course Description:
Choosing the topic, establishing the project, literature review, preparing for/or preliminary conducting the experiments, collecting the field data & developing the mathematical / computer model if applicable, writing the first part of the project along with any preliminary findings.

Pre –requisite (if any): Passing 127 credits hours

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————————————— **Courses of level 10** —————————————

492CE-2   Graduation Project 2   2 (1 , 2 , 0)

Objective:

By the completion of the course, the students should be able to:
● To independently work on students' initiative.
● Identify the stages of project preparation and information
● To enthusiastically explore one or more areas of their program in depth.
● To thoroughly gather and manage information in a scientifically rigorous method.
● Develop a project plan and collect the necessary data and information with him
● To competently process and integrate materials in a sustained exercise of intellectual ordering.
● To skillfully produce coherent, literate official documents.
● To constructively appreciate and incessantly involved in life-long learning.
● To initiate students their path of success in the future industrial careers.
● To design component or system in civil engineering discipline
● To consider sustainability, environmental, issues and determine optimum solution and design.

Course Description:

Continuation of part I (491 CE-2 :graduation project 1)of the project including : running and finalizing the experimental program or the mathematical / computer model, analyzing the results and findings and drawing the conclusion, writing the complete project report, presenting and defending the project.

Pre –requisite (if any): 491 CE-2: Graduation Project 1

414 CE-3 Water Resources Planning and Management   3 (3, 0 ,1)

Objectives:

1. Define and identify water planning and management
2. Application of economic principles (Cost – Benefit and Microeconomic analysis.
3. Application of operations research (linear and nonlinear optimization, and simulation modeling) to various water resource allocation problems .
4. Learn how to develop suitable plans for water resource development and flood management and opportunities for flood damage reduction.

Course Description:

Global water availability ,water Use by Sector, water Scarcity, water resources in Saudi Arabia , sustainable management of Water Resources, economic analysis of alternative water plans, design, and operation of water resources systems using mathematical optimization and models, linear Programming, river Basin Planning, system performance Indicators, river Basin modelling and flood Management.

Text Book:

Loucks, Daniel P. and Eelco van Beek, Water Resources Systems Planning and Management: An Introduction to Methods, Models and Applications, UNESCO, Paris, 2005 (Available free online: https://ecommons.cornel.edu/handle/1813/2798

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482CE-3   Contract and Specifications   3 (3 , 0 , 1)

Objective:
-Learn the fundamentals of legal systems in construction.

-Understand different kinds of construction contracts.

-Know why one kind of contracts should be used rather than another.

-Learn contract administration such as claims and disputes, change orders and progress payments.

-Study the current trend toward alternative project delivery systems via contractual arrangements such as design-build and construction management at risk.

-Understand potential legal issues associated with alternative project delivery systems.

- Study how to recognize the possibilities of construction disputes.

-Investigate how to avoid the possibilities of construction disputes via alternative dispute resolution (ADR).

-Understand potential possibilities of construction disputes and how to resolve them in foreign countries.

-Demonstrate the ability to review and make construction contracts and specifications.

Course Description:
Basics of construction law are covered, including types and selection of construction contracts. Topics include ingredients of engineering contracts, responsibilities and rights for the Contract Parties. International and Saudi standard contracts are presented to familiarize the students of the way Engineering Projects are administered time, cost and quality wise.

Application of the construction contracts, drawings, and specifications to the construction process. Ethical issues in project administration. The methodology, procedures and organizational techniques involved in preparing and evaluating bids and contracts. Types of construction contracts, general and special conditions of contract, standard specifications and contract. Procedures for systematic handling of variations, claims and disputes and their clarification with their legal implications.

Pre –requisite (if any):

Textbook:
-Construction Contracts, Keith Collier , Prentice Hall.

-Engineering and Construction Law and Contracts, J. K. Yates, 1st Edition, Pearson, 2010

-Construction Contracts by Keith Collier, 3rd Edition, Pearson, 2001.

-Construction Contract Administration for Project Owners by Claude G. Lancome, 1st Edition, 2017

472CE-3 Environmental Engineering   3 (3 , 0 , 1)

Objective:
By the end of this semester, students will be able to:

- Identify the causes and effects of global environmental issues.

- apply material balance equation in civil eng. projects

- Estimate the quantity of clean energy from construction project

- Define engineering techniques to reduce carbon emissions in various climatic conditions. and propose effective solutions accordingly

- Evaluate construction material in terms of its energy efficiency by calculating R-value and/ or U-value .

- Define units and tools used to report air & noise pollution data.

- Calculate average mass of solid waste and construct a MSW landfill. and propose sustainable

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solution to reduce waste (e.g waste to energy).

- Utilize environmental tools (e.g LEED) to evaluate building performance in terms of its environmental impact.

- Perform a detailed and critical analysis of a given construction project that was complied with environmental and sustainable dimensions and criteria.

Description:

This course has various subjects including: Environment Chemistry: Greenhouse gas, causes of global warming and climate change. Energy and Matter: classification of material flow, material balance. Carbon Footprint Reduction: clean energy, energy efficiency, innovative techniques to control CO_2 emissions. Pollution: Water Pollution, Air Pollution, and Noise Pollution, measurements, causes & effects and control. Solid Waste Management: reduce, reuse, and recycle, MSW landfill. Environmental Assessment Method definition, importance, main features, Well-known tools such as LEED, Case study in Saudi Arabia.

Text Book:

Introduction to Environmental Engineering", McGraw Hill International Edition, by Mackenzie L. Davis and David A. Cornwell, 4th edition, 2008.

C.J. Kibert (2008) "Sustainable Construction: Green Building Design and Delivery", 2nd Ed., John Wiley, Hoboken, New Jersey

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—————————————— **Courses of level 11** ——————————————

490CE-0   Field Training   0 (0 , 0 , 0)

Objective:

At the end of the field training students will be able to :-

1. Acquire knowledge about field career.
2. Gain experience of engineers, technicians and identify their working lives.
3. Link theoretical study with the practical reality.
4. Communicate with others and listen to their opinions and discussion.
5. Formulate and solve civil engineering problems.
6. Demonstrate full responsibilities in filed.
7. Gain the skill of writing preparation of technical reports.

Course Description:

The major student activities taking place during the field experience:-

▪Working in one of civil engineering projects.

▪Preparing the plan for the project.

▪Working according to all the organization rules and regulations.

▪Submitting a detail final report about his training work at the organization.

▪Recognition of the actual civil engineering field requirements, problems, and experience of the real work environment.

▪Working in a team to acquire the character of cooperation and self-integration.

▪Implementing the theoretical background in   the practical circumstances.

▪Getting the experience on the new construction techniques and machines.

▪Learning methods of civil engineering design and the available software for drawing and design.

▪Learning to deal and understand the engineering drawing and documentation.

Pre –requisite (if any): Passing 127 credit hours

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──────────────── **Elective Courses** ────────────────

456CE-3 Analysis and Design of Buildings   3 (3 , 0 , 1)

Course Main Objective:
Students will understand principles of designing buildings and structures taking into account modern achievements in the field of calculation and design requirements for buildings and structures, theorems and principles of mechanics.

Course Description:
Structural design process of RC buildings, preliminary design and selection of appropriate structural system. Integration and implementation of analysis and design process through a term-long design project of real structures utilizing modern computer software and including: idealization and modeling of structures, estimation of gravity and wind loads, results validation and verification, preparation of structural drawings and details.

Prerequisite: 354 CE-3 Reinforced Concrete

Text Book:
1.American Concrete Institute, "ACI Detail Manual".
2.ACI Committee 318, "Building Code Requirements for Structural Concrete (ACI 318M-14) and Commentary (ACI 318RM-14)", American Concrete Institute, Farmington Hills, MI.
3.Saudi Building Code 304, "Saudi Building Code Requirements for Structural Concrete (SBC 304-07)".

457CE-3 Selected Topics in Structural Engineering   3 (3, 0, 1)

Course Main Objective:
Cover different selected structural engineering topics.

Course Description:
Different selected structural engineering topics that are not covered in other courses such as; fundamentals of structural dynamics. Introduction to seismic design. Design of different systems of slabs , shear walls, tanks, and silos, Pre-stressed Concrete Design.

Prerequisite: 354 CE-3 Reinforced Concrete II

Text Book:
1.Chopra, A. K., "Dynamics of Structures", Latest Edition, Pearson.
2.J. K. Wight and J. G. MacGregor, "Reinforced Concrete: Mechanics and Design" 6th
3.Naaman, A. E. Prestressed concrete analysis and design: fundamentals, McGraw-Hill New York, Latest Edition.
4.ACI Committee 318, Building Code Requirements for Structural Concrete (ACI 318-11) and Commentary, American Concrete Institute, Farmington Hills, MI, 2011, 480 pp.
5.Saudi Building Code 304, Saudi Building Code Requirements for Structural Concrete (SBC 304).

483CE-3 Construction Cost Estimation   3 (3, 0, 1)

Objective:
Course description:
The estimating process. Conceptual estimation. Range estimation. Detailed estimate. Quantity take-off from plans and specifications. Earthwork. Concrete. Masonry. Carpentry and steel. Mechanical and Electrical estimating. Heavy construction. Profit and bonds. Labor productivity.

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Construction Cost Control Methods, Earned Value Method (EVM)
Computers in estimating.
Perquisite: 306GE-2
Textbook:
Stephen and Roger W. Liska, "Building Construction Estimation", McGraw-Hill.

484CE-3 Selected Topics in Construction Engineering   3 (3 , 0 , 1)
Objective:
●Cover unique topics of current interests in construction engineering and management.
●Cover the contemporary and present theories and tools that will be beneficial for the students.
Course description:
This course will cover the contemporary and present theories and tools that will be beneficial for the students. This course covers unique topics of current interests in construction management. The course may feature a detailed look at a single topic or a series of focused topical presentations.
Perquisite: 483CE-3
Textbook:
Managing The Construction Process: Estimating Scheduling, And Vproject Control, Frederick E. Gould, Pearson Prentice Hall 2010
- Construction Planning And Scheduling, Jimmie W. Hinze, 3rd Edition

415CE-3   Design of hydraulics structures   3 (3 , 0 , 1)
Course description:
Advantages and functions of hydraulic structures. Classification of hydraulic structures according to use .Flow through orifices. Culverts. Under gates. Over weirs and spillways. Energy dissipation below hydraulic structures. Hydraulic design of culverts, Weirs, Spillways and dams.
Objectives:
1- develop the understanding of basic principles and concepts of analysis and design of hydraulic structures
2- Analyze and design different dams and select the proper dam for any practical problem
3- Design of various energy dissipation structures and highway culvert
Text Book:
1- Novak, P., Moffat, A. Nalluri, C. and Narayanan, R., Hydraulic Structures, 3ed Ed., 2001.
2. Garg. S.K.Irrigation Engineering and Hydraulic Structures, Khanna publisher 2006.

424 CE-3 : Improvement of Geotechnical Materials   3 (3 , 0 , 1)
Course Learning Objectives:
By the completion of the course, the students should be able to:
●Enhancing soil Engineering Performance
●Recognizing mechanical & Chemical stabilization methods of soils
●Designing earth reinforcement
Course Description:
Improving performance of soils for engineering applications. Analysis of methods of stabilizing soils and rocks including topics on: Mechanical and chemical stabilization and earth reinforcement.
 Prerequisite: 322 CE -3

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Text Book:
Moseley, M.P. "Ground Improvement", Blackie Academic & Professional.

Reference:
 Hausmann, M.R. "Engineering Principles of Ground Modification". McGraw-Hill

425 CE-3 : Selected Topics in Geotechnical Engineering   3 (3 , 0 , 1)
Course Learning Objectives:
By the completion of the course, the students should be able to:
●Explaining the behavior of saturated and unsaturated soils
●Deal with specific problems in geotechnical aspect specified by the instructor
●Using software for geotechnical applications
●Appling the fundamental of soil dynamic and geo-environmental engineering.
Course Description:
Soil behavior. Computer applications in geotechnical engineering. Seepage and consolidation. Soil dynamics. Principles of unsaturated soil mechanics. Geo-environmental engineering.
Prerequisites: 322 CE -3

Text Book:
1- Problematic Soils and Geoenvironmental Concerns, (2018), Madhavi Latha Gali, Proceedings of IGC.
2- Soil Dynamics and Earthquake Geotechnical Engineering, Lecture Notes in Civil Engineering, (2016), Boominathan Adimoolam and Subhadeep Banerjee, IGC, Volume 3.

CE 473-3   Environmental assessment and management of environmental systems
                                                                            (3, 0, 0)
Objective:
By the end of this semester, students will be able to:
▪Identify the principles of environmental assessment impact
▪Differentiate between the methods of environmental assessment impact
▪Define schemes, methods, and tools that are used in the process of environmental assessment
▪Perform an analytical study based on selected case study.
Description:
This course is designed to expand the knowledge and skills of students with regard to the principles of environmental assessment impact. The background of tools and schemes that used to assess environmental impacts are taken into account with great deal of studying related environmental, social and economic factors. Key measurements and criteria of environmental systems will be covered to show its significance on improving the quality of living and sustainability development. Case studies of related projects are covered to present different approaches of holistic environmental assessment methods.
Text Book:
Canter, Larry W., "Environmental Impact Assessment" ", McGraw Hill

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433CE-3 Transportation planning   3 (3 , 0 , 1)

Objectives:
Introduce the students to transportation planning via small problems and a case study application. The techniques for modeling, planning, and designing transportation systems will be the focus of this class.

Course Description:
Theoretical foundations of transportation planning, design, and analysis methods. Theory and application of aggregate and disaggregate models for land use development, trip generation, and destination, mode, and route choice. Transportation network analysis. Planning, design, and evaluation of system alternatives.

Prerequisite: CE 331-3

Text Book:
1.Ortuzar & Willumsen (2011). Modeling Transport. 4th Edition, John Wiley & Sons, Inc.

CE 462-3 Remote Sensing and GIS Applications in Civil Engineering   3 (2 , 2 , 1)

Objectives:
2. Course Main Objective
1.Introduction to geographic information systems (GIS), definitions; queries in GIS; relation between GIS and other sciences; projection systems and mutual transformation using GIS; concept of data base; methods of tables connection and spatial analysis in GIS; DEM production using GIS; Selective applications in GIS.
2.The global positioning system (GPS), satellite orbit motion; signal propagation & errors; surveying by satellite geodesy; GNSS data processing & transformation; application of satellite geodesy; computer applications.
3.Introduction to introduction to photogrammetry.
4.Remote sensing and its applications, techniques utilized to interpret remote sensing imagery visually.
5.Used software to computer-assisted image interpretation & GIS.

Course Description:
Covers the basic concepts of remote sensing and geographic information systems, the methods and software used to implement them, and their applications for environmental and urban applications. Data collection using GPS and other tools.

Prerequisite: CE 261-3

Text Book:
●Michael Kennedy, " The Global Positioning System and GIS: An Introduction", T & F Books UK (2007).
Edward M. Mikhail, James S. Bethel, and J. Chris McGlone," Introduction to Modern Photogrammetry", Publisher: Wiley, last version