



المملكة العربية السعودية
المؤسسة العامة للتدريب التقني والمهني
الإدارة العامة لتصميم وتطوير المناهج

الكليات التقنية

CURRICULUM

FOR

Department

Electronics

Major

Biomedical Technology





Program Description:

This program of This program of biomedical technology is designed so as to meet the training needs of the local labor market, following professional International standards set for Electronic Engineering Technology. Training in this program includes general skills in English, mathematics and professional ethics, methods of human communication ,interaction skills , project management, Quality management and leadership. It also includes training on Intermediate skills in computer and electrical engineering and basic skills in Mechanical as well as specialized skills in the field of electronics, such as: Analog and Digital Pulses, Signals and Systems, Computer Aided Design, Sensors and measurement systems ,Embedded Systems , Optoelectronics , Digital Systems Design , Electromechanical Systems , Process Control , Digital Control Systems , Robotics , Artificial Intelligence. In this training program the trainees spend (2019) training hours in college in addition to (420) hours of training in the labor market .

The graduates of this program will be given a bachelor degrees in the specialization of “biomedical technology”. Graduates of this program must demonstrate:

- The ability to analyze, design, and implement control systems, instrumentation systems, communications systems and electronics system .
- Repair the mechanical faults for the medical equipment
- The a ability to maintain and calibrate the medical equipment
- Repair the electronic& electrical faults for biomedical equipment
- Knowledge on troubleshooting
- Installation and operation of medical equipment.



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Seventh Trimester

	Course Code	Course Name	Prereq	No. of Units				
				CRH	L	P	T	CTH
1	ISL 305	Islamic Culture (3)		2	2	0	0	2
2	MAH 325	Mathematics (3)		4	3	2	1	6
3	PHY 325	Physics (2)		4	3	2	0	5
4	COM 385	Advance Computer Applications		2	0	4	0	4
5	ENG 305	English (1)		2	2	0	2	4
6	ELC 345	Analog and pulses Circuits		4	3	2	0	5
Total				18	14	8	4	26

L = Lecture Hours, W = Workshop/Laboratory Hours, T = Tutorial Hours

Eighth Trimester

	Course Code	Course Name	Prereq	No. of Units				
				CRH	L	P	T	CTH
1	ARB 305	Arabic (2)		2	2	0	0	2
2	MAH 326	Mathematics (4)		4	3	2	1	6
3	ENG 306	English (2)		2	2	0	2	4
4	COM 325	Computer Programming		3	2	2	0	4
5	ELC 335	Signals and systems	MAH 325	3	3	0	0	3
6	BMT 375	Control Systems for Biomedical Instruments	MAH325	3	2	2	0	4
Total				17	15	4	4	23

L = Lecture Hours, W = Workshop/Laboratory Hours, T = Tutorial Hours

Ninth Trimester

	Course Code	Course Name	Prereq	No. of Units				
				CRH	L	P	T	CTH
1	ENG 307	English (3)		2	2	0	2	4
2	GMS 435	Introduction to Management & Leadership		2	2	0	2	4
3	GMS 436	Commutation Skills		2	2	0	2	4
4	ELC 346	Sensors and measurement systems		3	2	2	0	4
5	ELC 386	Embedded Systems		2	0	4	0	4
6	ELC 336	Optical Electronics		2	2	0	0	2
7	ELC 377	Digital Systems Design		3	2	2	0	4
Total				15	10	10	6	26

L = Lecture Hours, W = Workshop/Laboratory Hours, T = Tutorial Hours



Tenth Trimester

	Course Code	Course Name	Prereq	No. of Units				
				CRH	L	P	T	CTH
1	ENG 308	English (4)		2	2	0	2	4
2	GMS 437	Engineering Project Management		3	3	0	2	5
3	MAH 425	Statistic & Probability		4	3	2	1	6
4	BMT 455	Diagnostic and Therapeutic Medical Equipments	ELC 346	٤	٤	٠	٠	٤
5	BMT 456	Biomedical Digital Signal processing	ELC 335	٢	٢	٠	٢	٤
6		Project (1)		1	0	2	0	2
Total				١٦	١٥	٤	٧	٢٥
L = Lecture Hours, W = Workshop/Laboratory Hours, T = Tutorial Hours								

Eleventh Trimester

	Course Code	Course Name	Prereq	No. of Units				
				CRH	L	P	T	CTH
1	ENG 309	English (5)		2	2	0	2	4
2	GMS 438	Quality Tools & Applications		3	3	0	2	5
3	GMS 439	Engineering Economics		2	2	0	2	4
4	BMT 457	Medical Information Systems		٢	٢	٠	٠	٢
5	BMT 458	Medical Imaging Systems	BMT 455	٢	٢	٠	٠	٢
٦	BMT 459	Biomedical Digital Image processing	BMT 456	٢	٢			٢
٧	BMT 496	Project (2)	BMT 495	2	0	4	0	4
Total				١٥	١٣	٤	٦	٢٣
L = Lecture Hours, W = Workshop/Laboratory Hours, T = Tutorial Hours								

Twelfth Trimester

	Course Code	Course Name	Prereq	No. of Units				
				CRH	L	P	T	CTH
		Co-operative Training		4	420			
Total				85				
The total training hours								
L = Lecture Hours, W = Workshop/Laboratory Hours, T = Tutorial Hours								



Brief description

ELC 345 Analog and pulses Circuits:

The course introduces analog electronics, with little mathematical or physical analysis and much opportunity to design and build circuits. The treatment moves quickly from fundamentals (for example, passive circuits made with resistors, capacitors) to designs with transistors and then gives most of its attention to the design of circuits using operational amplifiers: circuits such as integrators, amplifiers, oscillators, filters, and a servo loop.

ELC 335 Signals and Systems:

The objectives of this course are to introduce students to the basic concepts of signals, system modeling, and system classification; to develop students' understanding of time-domain and frequencydomain approaches to the analysis of continuous and discrete systems; to provide students with necessary tools and techniques to analyze electrical networks and systems; and to develop students' ability to apply modern simulation software to system analysis.

BMT 375 Control Systems for Biomedical Instruments:

This course is designed to give the student a basic knowledge of the control system in general. The student has to know how to analyze any electric circuit using the different methods of analysis. Also this course is designed to give the student a basic knowledge of designing the Feedback Systems.

ELC 346 Sensors and measurement systems:

You will be trained to interpret important physical principles applied in sensors and measurement. You learn to design and fabricate sensors with desired physical and chemical properties. You will become familiar with various types of sensors including thermal, mechanical, electrical, electromechanical, optical and Gas sensors. You learn how to use these sensors for physical, chemical, and biological applications. Finally, you will design an electronic instrumentation.

ELC 386 Embedded Systems:

This is a hardware and interface oriented course. It presents in details the different parts of an embedded system based on FPGA. The embedded systems contain both hardware and software components and therefore a hardware/software co-design will be also mentioned. The course will give a basic knowledge on specification methods, design representations as well as related design methods. Special emphasis will be put on interface synthesis and low-power design methods.

**ELC 336 Optical Electronics:**

The goals of this course are to introduce the trainees to the generation, propagation, and detection of optical electromagnetic waves and gain a fundamental understanding of the basic physics and technology of quantum electronics devices and laser systems. These fundamentals include optical beam propagation in free space, in media and in cavities, interaction of electromagnetic radiation with matter, the creation of population inversions in various media, and the design of laser systems. Upon mastery of these fundamentals, students should be able to design simple laser systems.

ELC 377 Digital Systems Design:

This course gives the trainees an introduction of Programmable Logic Devices (PLD) technology and the design of digital systems using PLDs. The design methodology, systematically introduced & used in the course.

BMT 455 Diagnostic and Therapeutic Medical Equipments:

This course is designed to give the student a basic knowledge of the medical equipment in general. The student has to know the principle and fundamentals of diagnostic and therapeutic medical equipments. Also this course is designed to give the student some applications on therapeutic and diagnostic equipments.

BMT 456 Biomedical Digital Signal Processing:

This course is designed to give the student a basic knowledge of the fundamental ideas of biomedical signals in general. The student has to know how to using the different methods of filters on biomedical digital signal processing. Also this course is designed to give the student some application.

BMT 457 Medical Information Systems:

This course is designed to give the student a basic knowledge on information system in general. The student has to know how to represent and uses of data. Also this course is designed to give the student a basic knowledge of medical information system .case study will present in this course.

BMT 458 Medical Imaging Systems:

This course is designed to Introduce the student to an introduction to medical imaging system and a basic knowledge about some of medical imaging system equipment's , and how it works .

BMT 459 Biomedical Digital Image processing:

This course is designed to give the student a basic knowledge of the Biomedical Digital Image processing. The student has to know the principal of imaging. Also this course is designed to give the student Application of digital image processing in Biomedical Images.



Courses description

Department	General Study	Major	All Majors
Course Name	Arabic 2	Course Code	ARB 305
Prerequisites		Credit Hours (L,W,T)	2 (2,0,0)

Course description :

This course concentrates on improving the advance skills of arabic composition of technical colleges students according to their needs and knowledge. It enables them to acquire enough knowledge of types of writing in Arabic. It also gives the theoretical description and practical training of the basic types : summarizing, report, and administrative message,..etc. The course also intends to introduce dictative and grammatic subjects to solve the problems of writing and the common mistakes in composition with training on them to change them to acquired linguistic experiences.

Topics :

- Building elements of the text.
- Types of functional writing.
- Types of technical writing.
- Writing mistakes.

Textbook :

كتاب: " التحرير الكتابي " للمؤلفين : د. حمدان الزهراني، د. فهد اللهيبي، د. سعد المطرفي . دار النشر : دار حافظ بجدة



Department	General Study	Major	All Majors
Course Name	Islamic Culture 3	Course Code	ISL 305
Prerequisites		Credit Hours (L,W,T)	2 (2,0,0)

Course description :

This course covers principle areas of Islam and Contemporary Issues such as islam systems (the aims of Islam, profession in Islam , and human right) considering to the determination of the general objectives of profession conception , the purposes, and the principles that islam brought, concentrating on what distinguishes islam in its organization with respect to its completeness, its detailing, and its linking between the purposes of sharia and what it brought as a social and economic system

Topics :

- Introduction to assets approach Sunnis.
- profession in Islam.
- Human Right in Islam.
- Suspicious cases in Human Right and response.

Textbook :

المدخل الى الثقافة الإسلامية – جامعة الملك سعود



Department	General Study	Major	All Majors
Course Name	Advance Computer Applications	Course Code	CMT 385
Prerequisites		Credit Hours (L,W,T)	2 (0,4,0)

Course description :

This course designed to give the student an advance skill of the Microsoft Word, Microsoft Excel and Microsoft Project. The student has to know how to use the advance option and create a professional document.

Topics :

- Microsoft Word : Use advance option and inset it inside the document
- Microsoft Excel : Use the high level option with workbooks
- Microsoft Project : Give a brief knowledge about how the student use the Microsoft Project

Experiments: if applicable it will support the theoretical topics.

References :

- Microsoft MOS



Detailed of practicals Contents

Week No	Contents	material	Hours
1	Create new documents apply templates	Microsoft Word	4
2	Inserting special characters (©, ™, £) Configure AutoCorrect Options Inserting Special Characters Using AutoCorrect Disabling AutoCorrect		4
3	Record simple macros Assign shortcut keys Manage macro security		4
4	Create new workbooks using templates Select a Template from the New Tab Search for Additional Templates	Microsoft Excel	4
5	Display dates and times with functions Summarize data with functions Use a financial function Use formulas to create subtotals Uncover formula errors		4
6	Demonstrate how to apply the SUM function Demonstrate how to apply the COUNT function Demonstrate how to apply the AVERAGE function Demonstrate how to apply the MIN and MAX functions		4
7	Import files Set data validation Create outlines Collapse groups of data in outlines Filter records Change the sort order Remove duplicates Manage macro security		4
8	Navigate in Microsoft Project Create a Project Schedule Define Project Calendars Enter Tasks and Task Details Organize Tasks into Phases Link Tasks Document Tasks Review the Project Schedule's Duration	Microsoft Project	4



9	<ul style="list-style-type: none"> Establish people resources Establish equipment resources Establish material resources Establish cost resources Establish resource pay rates Adjust resource working times Add resource notes 	Microsoft Project	4
10	<ul style="list-style-type: none"> Assign work resources to tasks Add more work resource assignments to tasks Assign material resources to tasks Assign cost resources to tasks 		4
11	<ul style="list-style-type: none"> Apply a task calendar to an individual task Change task types Split a task Establish recurring tasks Apply task constraints Review the project's critical path View resource allocations over time 		4



Department	General Study	Major	All Majors
Course Name	Computer Programming	Course Code	CMT 325
Prerequisites		Credit Hours (L, W, T)	3 (2,2,0)

Course description :

The main purpose of this course is to help the trainees increase their programming and problem solving skills.

This course should provide trainees with basic Knowledge of C++-Programming, regarding syntax and applied practice, with a focus on object-oriented design principles.

Topics :

- Problem-Solving and Introduction programs and C++.
- Elementary programming.
- Selections.
- Mathematical Functions, Characters, and Strings.
- Loops.
- Functions.
- Arrays.
- Objects and classes.

Experiments: if applicable it will support the theoretical topics.

References :

- Y. Daniel Liang, Introduction to Programming with C++, 3/E.
- Gary J. Bronson, C++ for Engineers and Scientists, 3/E.



Detailed of Theoretical Contents

	Contents	Week no.	Hours
1	Problem-Solving and Introduction programs and C++: <ul style="list-style-type: none"> - Algorithms and Flowchart. - Understand software development cycle. - Realize the fundamental of C ++. 	1	2
2	Elementary programming : <ul style="list-style-type: none"> - Study basic data types, their declarations and initializations. - Characters, and Strings. - Use variables to store data. 	2	4
3	Selections : <ul style="list-style-type: none"> - Implement selection control using if and switch statements - Combine conditions using logical operators - Write expressions using the conditional operator. - Format output using stream manipulators. - Examine the rules governing operator precedence and operator associativity . 	1	2
4	Loops: <ul style="list-style-type: none"> - Write loops using do-while, while and for statements. - Control a loop with the user confirmation or a sentinel value. - Write nested loops. - Learn the techniques for minimizing numerical errors. - Implement program control with break and continue . 	1	2
5	Function basics: <ul style="list-style-type: none"> - Mathematical Functions. - Define and invoke different types of functions. - Use function prototypes for function headers. - Know how to pass arguments. - Create header files for reusing functions. - Develop functions for various tasks - Develop applications using C++ functions . 	2	4
6	Advanced function feature: <ul style="list-style-type: none"> - Experience advanced topics on pass-by-value, pass-by-reference. - Understand the difference between them. - Determine the scope of local and global variables. - Define functions with default arguments. - Improve runtime efficiency by using inline functions . 	1	2
7	Arrays : <ul style="list-style-type: none"> - Understand the necessity of an array in programming. - Know how to declare and initialize an array. - Program common array operations. - Develop and invoke functions with array arguments. 	2	4



	- Process string using C-strings .		
8	Objects and classes: <ul style="list-style-type: none"> - Describe objects and classes. - Create objects using constructors. - Distinguish between instance and static variables and functions. - Access data fields and invoke functions using the object member access operator. - Declare private data fields for data field encapsulation and make classes easy to maintain . 	2	4
9	Files and streams: <ul style="list-style-type: none"> - Learn ifstream, ofstream, and fstream classes for processing and manipulating files. - Read and write data using the getline, get and put functions. - Study functions to test file existence and the end of a file. - Open a file for both input and output to update files . 	1	2
Textbook:		Y. Daniel Liang, Introduction to Programming with C++, 3/E. Gary J. Bronson, C++ for Engineers and Scientists, 3/E.	



Detailed of practical Contents

	Contents	Week no.	Hours
1	Algorithms and draw flowchart exercises.	1	2
2	Develop a simple C++ program for console output using Visual C++. Read input from keyboard. Program with assignment statements and expressions familiar with C++ documentation, programming style. Experience various errors and debug logic errors .	2	4
3	Training on Selections statements.	1	2
4	Training on looping statements.	1	2
5	Training on functions.	3	6
6	Training on Arrays .	2	4
8	Training on Objects and classes.	2	4
9	Training on Files and streams.	1	2
Textbook:		Y. Daniel Liang, Introduction to Programming with C++, 3/E.	



Department	All Departments	Major	All Majors
Course Name	English 1	Course Code	ENG 305
Prerequisites		Credit Hours (L, W, T)	2 (2,0,2)

Course description :

English 1 is reading course. It is about improving and empowering Student's reading. Through exposure to different types of reading and approach to reading, the learners learn the strategies and practice for strengthening comprehension skills, building vocabulary, and test preparation.

Topics :

- Reading for Pleasure:

lets students select their own reading materials to practice new strategies and broaden their vocabulary.

- Reading Comprehension Skills:

covers skimming, scanning, recognizing topics and main ideas, understanding sentences, and making inferences.

- Thinking Skills:

involves targeted practice in inference and analytic skills.

- Reading Faster:

helps students develop speed and flexibility in reading with high interest, short fiction and non-fiction selections.

- Reading Faster texts (which includes different types of reading) Fiction, Biography, Non-fiction

Experiments :if applicable it will support the theoretical topics.

References :

- Skillful Reading: A Text and Workbook for Students of English as a Second Language
by Amy L. Sonka , Elizabeth Whalley.

- Practice Makes Perfect Intermediate English Reading and Comprehension
by Diane Engelhardt

- NorthStar: Reading and Writing, Level 2, 3rd Edition
by [Natasha Haugnes](#), Beth Maher



Detailed of Theoretical Contents

	Contents	Week no.	Hours
1	Part 1- Extensive Reading	1	2
2	Part 2- Vocabulary Learning and Building	2-3	4
3	Part 3- Comprehension Skills	4	2
4	Previewing	5	2
5	Scanning	6	2
6	Making Inferences	7	2
7	Focusing on the Topic	8	2
8	Understanding Paragraphs	9	2
9	Identifying the Pattern	10	2
10	Thinking in English	11	2
11	Summarizing	12	2
12	Final Assessment	13	2
Textbook:	<u>Reading Power 2</u> (4th Edition) [Paperback] Linda Jeffries, Beatrice S. Mikulecky Pearson Education ESL; •ISBN-10: 0138143889 •ISBN-13: 978-0138143886		



Department	All Departments	Major	All Majors
Course Name	English 2	Course Code	ENG 306
Prerequisites	English 1	Credit Hours (L, W, T)	2 (2,0,2)

Course description :

English 2 is a reading course for intermediate students of English. It builds on high-interest, authentic reading passages that serve as springboards for reading skills development, vocabulary building, Language analysis, and thought-provoking discussions and writing.

Topics :

- Using context
- Skimming
- Topic vs. Main idea
- Inferencing
- Using headings
- Using headings
- Using context
- Reading Instructional materials
- Finding details
- Main ideas
- Using examples

Experiments: if applicable it will support the theoretical topics.

References :

- Select Readings: Student Book Upper-Intermediate
by Linda Lee
- Academic Reading
by Kathleen T. McWhorter, Brette M Sember



Detailed of Theoretical Contents

	Content	Week no.	Hours
1	Father teaches son a lesson	1	4
2	How to work In groups with classmates	2	4
3	An exchange student in the US	3	4
4	Disability leads to Success	4	4
5	The art of good speech making	5	4
6	The art of good speech making	6	4
7	An interview with Bill Gates about the future	7	4
8	Applying for effectively in	8	4
9	Spanish siesta tradition	9	4
10	How can the public be 'helped to understand I science?	10	4
11	Ways that geniuses think	11	4
Textbook:		Select readings intermediate by Linda Lee and Erik Gundersen. OXFORD UNIVERSITY PRESS ISBN 0-19-437475-0	



Department	All Departments	Major	All Majors
Course Name	English 3	Course Code	ELC 307
Prerequisites	English 2	Credit Hours (L,W,T)	2 (2,0,2)

Course description :

English 3 is writing course. It is an intermediate course for English language. It helps students to master the standard organisational patterns of the paragraph and the basic concepts of essay writing. It integrates the study of rhetorical patterns and the writing process with extensive practice in sentence structure and mechanics.

Topics :

- Paragraph Format
- Narrative Paragraphs
- Paragraph Structure
- Descriptive Paragraphs
- logical Division of ideas
- Process Paragraphs
- Comparison/Contrast Paragraphs
- Definition Paragraphs
- Essay Organization
- Opinion Essays

Experiments: if applicable it will support the theoretical topics.

References :

- [First Steps in Academic Writing](#) , by Ann Hogue
- Academic Writing Student's Book , by [Dorothy Zemach](#) and [Lisa Rumisek](#)



Detailed of Theoretical Contents			
	Content	Week	Hours
1	Definition Paragraphs Paragraph 1: Paragraph 2: Sentence Structure Appositives and Adjective Clauses Appositives Adjective Clauses Complex Sentences with Adjective Clauses Subject Pronouns: who, which, that Object Pronouns: whom, which, that, and 0 (no pronoun) Clauses with when	1	4
2	Tim order Time Order Signal Sentence Structure Compound Sentences Coordinating Conjunctions Punctuation Three Comma Rules The Writing Process Freewriting Model: Freewriting	1	4
3	Three Parts of a Paragraph A Hawaiian Wedding The Topic Sentence Supporting Sentences The Concluding Sentence Punctuation Apostrophes The Writing Process Outlining Detailed Outlining	2	8



4	<p>Model: Descriptive Paragraph Spatial Order Spatial Order Signals Topic Sentences for Descriptive Paragraphs Supporting Sentences for Descriptive Paragraphs Model: Descriptive Details Paragraph Unity Sentence Structure Model: Compound Sentences Compound Sentences Varying Sentence Openings Clustering</p>	1	4
5	<p>Logical Division of Ideas Paragraph Logical Division of Ideas Coherence Using Nouns and Pronouns Consistently Transition Signals Run-Ons and Comma Splices</p>	1	4
6	<p>Process Paragraph Time Order Time Order Signals Clauses and Complex Sentences Clauses Complex Sentences Subordinators</p>	2	8
7	<p>Comparison/Contrast Paragraphs Paragraph 1: Right Brain/Left Brain Paragraph 2: Two Job Applicants Block Organization Point-by-Point Organization Comparison/Contrast Signals Comparison Signals Contrast Signals</p>	1	4



8	<p>Definition Paragraphs</p> <p>Paragraph 1:</p> <p>Paragraph 2:</p> <p>Sentence Structure</p> <p>Appositives and Adjective Clauses Appositives</p> <p>Adjective Clauses</p> <p>Complex Sentences with Adjective Clauses</p> <p>Subject Pronouns: who, which, that</p> <p>Object Pronouns: whom, which, that, and 0 (no pronoun)</p> <p>Clauses with when</p>	1	4
9	<p>Three Parts of an Essay</p> <p>Essay Structure</p> <p>The Introductory Paragraph</p> <p>Body Paragraphs</p> <p>The Concluding Paragraph</p> <p>Transitions Between Paragraphs</p> <p>Essay Outlining</p> <p>Essay Outline</p> <p>Planning an Essay</p> <p>Step 1 Prewriting 162</p> <p>Step 2 Organizing</p> <p>Step 2A Group Ideas Logically</p> <p>Step 2B Make an Outline</p>	2	8
10	<p>Opinion Essay The Right to Die</p> <p>Organization</p> <p>The Introductory Paragraph</p> <p>Bogy Paragraphs</p> <p>The Concluding Paragraph</p> <p>Developing Supporting Details</p> <p>Quotations</p> <p>Rules for Using and Punctuating Quotations Statistics</p>	1	4



Department	All Departments	Major	All Majors
Course Name	English 4	Course Code	ENG 308
Prerequisites	English 3	Credit Hours (L, W, T)	2 (2,0,2)

Course description :

English 4 is a writing course .It covers transactional writing versus academic writing, producing informative and persuasive documents through process writing, developing analytical writing techniques, constructing technical reports, and writing letters, memos, email and related forms. In addition, it addresses the task of formulating resumes and cover letters for employment.

Topics :

- Description of a mechanism
- Description of a process
- Proposals
- Feasibility report
- Laboratory report
- Business communications
- Resume and coverletters

References :

- Writing Academic English

by Alice Oshima, Ann Hogue

- Cambridge Academic English

By Martin Hewings, Michael McCarthy



Department	All Departments	Major	All Majors
Course Name	English 5	Course Code	ENG 309
Prerequisites	English 4	Credit Hours (L,W,T)	2 (2,0,2)
Course description : Detailed of Theoretical Contents			
English 5 is a communication skill course. It is a course designed to develop students' oral, written, and interpersonal communication skills essential for life and work. Students will learn communication principles, strategies, and methods through discussions, exercises, and examples. They will be trained in how to communicate clearly and effectively in various social, business, and intercultural situations. In addition, they will learn and practice verbal, nonverbal, and electronic communication.			
Contents		Week	Hours
1. Ethical Considerations			2
2. Technical Definition			2
Topics :			
3	Descriptions of a Mechanism • <u>What is Communication?</u>	2	2
4	Descriptions of a Process • <u>Effective Listening Skills</u> • <u>Verbal Communication</u>		2
5	Proposals • <u>Communicating Over the Phone</u>	3	4
6	Progress Reports • <u>Nonverbal Communication</u> • <u>Written Communication</u>	4	4
7	Feasibility and Recommendation Reports • <u>Communicating Electronically</u>	5	4
8	Laboratory and Project Reports	6	2
Experiments: if applicable it will support the theoretical topics.			
9	Instructions and Manuals		2
References:			
10	Research Reports	7	4
11	Abstr • Guide to Presentations , by Lynn Russell, Mary Munter • Technical Communication , by Mike Markel		
12	Grammar, Style, and Punctuation		2
13	Documentation	9	4
14	Visuals		2
15	Electronic Publishing	10	2
16	Presentations and Briefings	11	4
17	Business Communications	12	4
18	Resumes, Cover Letters, and Interviews	13	2
Textbook:	Pocket Book of Technical Writing, 3 rd , By Finkelstein, L., McGraw Hill, USA, 2008		





Detailed of Theoretical Contents			
	Content	Week	Hours
1	Good Communication Skills Lead to Success Different Forms of Communication Communication Is a Learned Activity Communication in the Workplace	1	4
2	What Is Listening? Listening to Learn Listening to Evaluate Listening Effectively Listening at Work	1	4
3	Your Voice Is a Tool Good Grammar Counts Starting a Conversation Ending a Conversation Speaking to Different Audiences Verbal Communication in the Workplace	2	8
4	Effective Phone Communication Using the Telephone Directory Long-Distance, Toll-Free, and Other Calls Phone Communication in the Workplace Using a Cell Phone	1	4
5	Body Action Body Language How Culture Affects Nonverbal Communication	2	8
6	Why Is Writing Important? Personal Letters Business Letters Business Memos Thank-You Notes Invitations	2	8
7	Communicating with E-mail Just Fax It to Me Instant Messaging Text Messaging How Technology Is Changing Workplace Communication	3	12



Department	General Study	Major	All Majors
Course Name	Physics (2)	Course Code	PHY325
Prerequisites	General physics	Credit Hours (L, W, T)	4(3,2,0)

Course description :

The course enables students to gain theoretical and practical background in physics. The course includes the development of skills and understanding of basic principles of Physical measurements. The student has to know the basic notions of the electric circuits and basic electronic devices like resistors and transistors, the measurement of characteristics of electric signals and the use of basic instrumentation and to know how to analyze any electric circuit using the different methods of analysis.. Also this course is designed to give the student a basic knowledge in the theory of electricity, electrostatics and magnetism.

Topics :

- Physical Measurements
- Direct-Current Circuits and Resistance
- Alternating Current Circuit (AC Circuit)
- Electrostatics
- The magnetic field
- Faraday's law of electromagnetic induction

Experiments: if applicable it will support the theoretical topics.

References :

- Microelectronics Digital and Analog Circuits and Systems – Jacob mill man- ISPN 0-07-042327. Update edition.
 - Physics Principal and Problems- Robert B. Clark, Patrick Kenealy> ISBN 0-02826721-4.



Detailed of Theoretical Contents			
Chapter	Contents	Week no.	Hours
1	<p>Physical Measurements : International System of Units, Base units, Derived Quantities, Derived units, Systems of units, Prefixes, Conversion between units, Fundamental Dimension, Derived dimension Dimensional Analysis, Dimensionally Homogeneous Equations, Examples and Problems.</p>	1-2	6
2	<p>Direct-Current Circuits and Resistance: Electric Current, Resistance and Ohm's Law, Energy and Power in Electric Circuits, Joule's Low, Resistors in Series and Parallel Kirchhoff's Rules, Circuits Containing Capacitors, Capacitors connected in series, Capacitors connected in parallel, RC Circuits, RC charging circuit, RC discharging circuit, Ammeters and Voltmeters, Examples and Problems</p>	3- 4 - 5	9
3	<p>Alternating Current Circuit (AC Circuit): AC source, Resistors in an AC circuit, rms current, rms voltage, Capacitors in an AC circuit, The capacitive reactance X_C, Inductors in an AC circuit, The inductive reactance X_L, The RLC series circuit, The impedance Z, The phase angle, The maximum voltages across the elements, Power in an AC circuit, Resonance in a series RLC circuit, The resonance frequency, The transformer, Examples and Problems</p>	6- 7 - 8	9
4	<p>Electrostatics: electric charge, Coulomb's low, The electric field due to a point charge, The electric potential due to a point charge, stored energy in a capacitor, dielectric materiel in capacitor, examples and problems</p>	9- 10	6



5	<p>The magnetic field: Magnetic field and magnetic field lines, Ampere's law: magnetic field due to a long straight wire, a circular conductor, a solenoid, Hall effect, Discovering of the electron and measuring e/m, The magnetic force, Examples and Problems</p> <p>Faraday's law of electromagnetic induction</p>	11- 12- 13	9
<p>Textbook:</p>		<p>1- Fundamentals of physics (extended edition) David Halliday Robert Resnick Gearal Walker John Wiley and Son , INC , ISBN -0 -471 – 57578-x. Fifth edition -1997</p> <p>2- Foundations Of Physics for Technology Colleges and universities freshmen . Dr. Marwan A. Alfahha Third edition 2012</p>	



Detailed of practicals Contents

	Contents	Week no.	Hours
1	Electric Components/Measurements and Instruments	1	2
		2	2
2	Current-Voltage (I-V) characteristics Evaluation of two unknown resistances R_1 and R_2	3	2
		4	2
3	Evaluate the equivalent resistance of some resistors connected in series and in parallel.	5	2
		6	2
4	RC circuit :Charging and discharging a capacitor when switching DC on and off	7	2
		8	2
5	Oscillator and oscilloscope	9	2
		10	2
6	Determination of the specific charge of the electron	11	2
		12	2
7	Study of the deflection of electron in a magnetic field into a circular orbit	13	2
Textbook:			



Department	General Study	Major	All Majors
Course Name	Mathematics (3) Linear Algebra	Course Code	MAT 325
Prerequisites	General Math	Credit Hours (L, W, T)	4 (3,2,1)

Course description :

This course is designed to give the student a basic knowledge of the Complex numbers and its operations. The student has to know the basic notions of vector spaces and how to solve any linear systems of equations using Gauss-Jordan Elimination. Also this course is designed to give the student an introduction to the first and second order linear differential equations and to solve initial value problem by Laplace Transforms.

Topics :

- ComplexNumber
- Vectorsspaces
- Linearsystems of equations
- Introduction to differentialequation
- Laplace Transform

Experiments: if applicable it will support the theoretical topics.

References :

- C. Edward and D.Penny, Elementary Linear Algebra.
- John Auer, Linear Algebra with application
- Albert L.Rabenstion, elementarydifferentialequationwithLinearAlgebra



Detailed of Theoretical Contents			
	Contents	Week no.	Hours
1	Complex Number: Operation on complex number- Demoiver theorem- Solution of a quadratic equation	1-2-3	18
2	Vector spaces: Basic notions of vectors spaces- subspaces- Linear combination, linear independent, basis and dimension of vector spaces	4-5-6	18
3	Linear systems of equations: Gauss-Jordan elimination- Elementary row operations- reduced row echelon form- Solution of linear system by gauss- Jordan elimination	7-8	12
4	Introduction to differential equations: Some first order of differential equation-Second order linear differential equation	9-10-11	18
5	Laplace transforms: Solving initial value problem by Laplace transform	12-13	12
Textbook:		C.Edward and D. penny, Elementary Linear Algebra	



Department	General Study	Major	All Majors
Course Name	Mathematics (4) Discrete and Numerical Analysis	Course Code	MAT 326
Prerequisites	General Math	Credit Hours (L, W, T)	4 (3,2,1)

Course description :

This course is designed to give the student a basic knowledge of the Sequences and the Numerical series. The student has to know the basic notions of the numerical method and how to solve any linear or non linear equations using Newton-Raphson method . Also this course is designed to learning the student how to apply the Linear and Quadratic Lagrange interpolation and the Rectangular and Trapezoidal method for numerical integration. Further, this course gives to the students an introduction to Fourier series and Fourier transform.

Topics :

- Sequences
- NumericalSeries
- NumericalMethod
- Computer compilation
- Fourier Analysis

Experiments: if applicable it will support the theoretical topics.

References :

- C. Woodford, Chris Phillips, Numerical Methods with Worked Examples.
- T. W. Körner, Fourier analysis
 - PremKythe, Dongming Wei, An Introduction to Linear and Nonlinear Finite Element Analysis



Detailed of Theoretical Contents			
	Contents	Week no.	Hours
1	Sequences: Some important limits-Convergence and divergence - Monotonocity and boundedness of sequences.	1-2-3	18
2	Numerical Series: Convergence and divergence series- some usual series (Harmonic, Geometric and P-series)- Positive series (integral, ratio tests)- Positive series: Integral, ratio, root and comparison tests. Power series: Interval of convergence-representation of function. Maclaurin and Taylor series.	4-5-6	18
3	Numerical Method: Newton-Raphson method for solving linear or nonlinear equations. Interpolation: Linear and quadratic Lagrange interpolation. Numerical integration: Rectangular and Trapezoidal method. Some Application on MATLAB	7-8-9-10	18
4	Fourier Analysis: Fourier seris- Fourier transform	11-12-13	9
Textbook:		Keith E. Hirst, Keith Edwin Hirst, Numbers, Sequences and Series	



Department	General Study	Major	All Majors
Course Name	Engineering statistics and probability	Course Code	STA 425
Prerequisites	General Math	Credit Hours (L, W, T)	4 (3,2,1)

Course description :

This course is designed for students majoring in engineering of technology. Topics include: probability, random variables, discrete and continuous probability distributions, statistical process control, and parameters estimation.

Topics :

- Introduction to Probability Vector spaces
- Random variable and Probability Distributions
- Some Discrete Probability Distribution
- Some Continuous Probability Distribution
- Introduction to statistics
- Parameter Estimation

Experiments: if applicable it will support the theoretical topics.

References :

- Ross, S. *A First Course in Probability*, Fifth Edition
- Devore, Jay L., *Probability and Statistics for Engineering and the Sciences*, Eighth Edition



Detailed of Theoretical Contents			
	Contents	Week no.	Hours
1	Introduction to Probability: Random Experiment - Sample space – Event – Counting Sample space – Probability of an Event - The Axioms of Probability – Conditional Probability – Independent Events	1-2-3	18
2	Random variable and Probability Distributions: Concept of a Random Variable - Discrete Probability Distribution-Continuous Probability Distribution - Mean and Variance of a Random Variable	4-5-6	18
3	Some Discrete Probability Distribution: Bernoulli Trials – Binomial Distribution – Poisson Distribution	7-8	12
4	Some Continuous Probability Distribution: Continuous Uniform Distribution – Normal Distribution – Exponential Distribution	9-10-11	18
5	Introduction to statistics and Parameter Estimation: Sampling Theory – Sample Distribution Function – Samples and Statistics – Methods of Estimation (Point , Interval) – Confidence Interval	12-13	12
Textbook:			



Department	General Study	Major	All Majors
Course Name	Introduction to management & leadership	Course Code	GMS 335
Prerequisites		Credit Hours (L, W, T)	2 (2,0,2)

Course description :

This course prepares students with a comprehensive introduction to effective management principles and conduct. It aims at providing students with an introduction to contemporary management concepts and skills, and encourages students to put these concepts and skills into practice. This course is an introduction to the management function. It will focus on the theory and fundamental concepts of management including planning, organization, leadership, and control. This class will review the evolution of management thought, function and practice and will stress current approaches and emerging concepts.

Topics :

- introduction to management
- integrativemanagerial issues
- Planning
- Organizing
- Leading
- controlling

Experiments : if applicable it will support the theoretical topics.

References :

- Robbins, Stephen P, and Coulter, Mary. (2012) Management, 11th Edition, Prentice Hall



Detailed of Theoretical Contents

	Contents	Week no.	Hours
1	Effective Management for Managers Today - Introduction to Management and Organizations. Management Yesterday and Today. Organizational Culture and Environment: The Constraints. Social Responsibility and Managerial Ethics.	4	8
2	Management Functions and Techniques - Decision-Making: The Essence of the Manager's Job. Foundations of Planning, planning tools and techniques. Organizational Structure and Design. Human.	3	6
3	Resource Management. Managing Change and Innovation. Understanding Groups and Teams. Leadership skills. Foundations of Control. Operations and Supply Chain Management.	2	4
4	Contemporary Management Competencies - Time Management Skills. Effective Communication Skills. Problem Solving Skills. Crisis Management	4	8
Textbook:	Robbins, Stephen P, and Coulter, Mary. (2012) Management, 11th Edition, Prentice Hall		



Department	General Study	Major	All Majors
Course Name	Communication Skills	Course Code	GMS 336
Prerequisites		Credit Hours (L, W, T)	2 (2,0,2)

Course description :

This course is intended to provide the students with plain understanding of the key subjects, matters and ideas educative in the field of communication studies.

Topics :

- Communication Today.
- Reports and proposals.
- Nonverbal communication.
- Interpersonal skills
- Interpersonal skills
- Negotiation skills
- Conflict management
- Intercultural communication
- Organizational communication
- Public communication
- Team communication

Experiments: if applicable it will support the theoretical topics.

References:

- Communicating in the 21st Century, 3rd edition By Baden Eunson 2011 1149 pages ISBN: 978-1-742-16617-9 John Wiley & Sons Limited Inc.



Detailed of practical's Contents

	Contents	Week no.	Hours
1	Communication Today. Letters, emails and memos.	1	2
2	Reports and proposals. Academic writing the essay.	2	2
3	Nonverbal communication.	3	2
4	Interpersonal skills: 1- Emotional intelligence , Self- talk and	4	2
5	Interpersonal skills: 2- Listening, questioning and feed-back.	5	2
6	Negotiation skills	6	2
7	Conflict management *** Mid-term Exam	7	2
8	Intercultural communication	8	2
9	Organizational communication	9	2
10	Public communication	10	2
11	Team communication	11	2
Textbook:		Communicating in the 21st Century, 3rd edition By Baden Eunson 2011 1149 pages ISBN: 978-1-742- 16617-9 John Wiley & Sons Limited Inc.	



Detailed of Theoretical Contents			
	Contents	Week no.	Hours
1	Communicating in meetings	12	2
2	Employment communication and social media. *** Final Exam.	13	2
Textbook:		Communicating in the 21st Century, 3rd edition By Baden Eunson 2011 1149 pages ISBN: 978-1-742- 16617-9 John Wiley & Sons Limited Inc.	



Department	General Study	Major	All Majors
Course Name	Engineering Project Management	Course Code	GMS 437
Prerequisites		Credit Hours (L,W,T)	(3,0,2)3

Course description :

The Engineering Project Management Course is intended to help meet the requirements of industry by educating undergraduate engineering students to understand engineering projects, project organizations and project management methods. Students completing this course will be able to work effectively in multidisciplinary engineering projects immediately after completion and to advance more rapidly within the project management organization and profession. The management of projects entails technical knowledge, engineering skills and management skills.

Topics :

- Introduction to project management
- Organizational influences and project life cycle.
- Project management processes
- Project integration management
- Project scope management.
- Project time management
- Project cost management.
- Project quality management
- Project humanresource management.
- Project communications management.
- Project risk management
- Project procurement management.
- Project stakeholder management

Experiments: if applicable it will support the theoretical topics.

References :

- A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Fifth Edition, Project Management Institute , Project Management Institute © 2013



Detailed of Theoretical Contents

	Contents	Week no.	Hours
1	1. Introduction to Project Management 1.1 History of Project Management 1.2 What is a Project? 1.2.1. The Relationships among Portfolios, Programs, and Projects. 1.3 What is Project Management? 1.4 Relationships among Portfolio Management, Program Management, Project Management, and Organizational Project Management 1.4.1 Program Management 1.4.2 Portfolio Management 1.4.3 Projects and Strategic Planning. 1.4.4 Project Management Office 1.5 Relationship between Project Management, Operations Management, and Organizational Strategy. 1.5.1 Operations and Project Management 1.5.2 Organizations and Project Management 1.6 Business Value 1.7 Role of the Project Manager 1.7.1 Responsibilities and Competencies of the Project Manager. 1.7.2 Interpersonal Skills of a Project Manager 1.8 Project Management Body of Knowledge	1	3
2	2. ORGANIZATIONAL INFLUENCES AND PROJECT LIFE CYCLE. 2.1 Organizational Influences on Project Management.	2	3



	<p>2.1.1 Organizational Cultures and Styles</p> <p>2.1.2 Organizational Communications</p> <p>2.1.3 Organizational Structures.</p> <p>2.1.4 Organizational Process Assets.</p> <p>2.1.5 Enterprise Environmental Factors</p> <p>2.2 Project Stakeholders and Governance.</p> <p>2.2.1 Project Stakeholders.</p> <p>2.2.2 Project Governance.</p> <p>2.2.3 Project Success.</p> <p>2.3 Project Team</p> <p>2.3.1 Composition of Project Teams</p> <p>2.4 Project Life Cycle.</p> <p>2.4.1 Characteristics of the Project Life Cycle</p> <p>2.4.2 Project Phases.</p>		
3	<p>3. PROJECT MANAGEMENT PROCESSES</p> <p>3.1 Common Project Management Process Interactions.</p> <p>3.2 Project Management Process Groups</p> <p>3.3 Initiating Process Group</p> <p>3.4 Planning Process Group</p> <p>3.5 Executing Process Group</p> <p>3.6 Monitoring and Controlling Process Group</p> <p>3.7 Closing Process Group</p> <p>3.8 Project Information</p> <p>3.9 Role of the Knowledge Areas</p>	3	3
4	<p>4. PROJECT INTEGRATION MANAGEMENT</p> <p>4.1 Develop Project Charter</p> <p>4.2 Develop Project Management Plan.</p>	4	3



	<p>4.3 Direct and Manage Project Work</p> <p>4.4 Monitor and Control Project Work</p> <p>4.5 Perform Integrated Change Control</p> <p>4.6 Close Project or Phase</p>		
5	<p>5. PROJECT SCOPE MANAGEMENT.</p> <p>5.1 Plan Scope Management.</p> <p>5.2 Collect Requirements</p> <p>5.3 Define Scope</p> <p>5.4 Create WBS</p> <p>5.5 Validate Scope.</p> <p>5.6 Control Scope</p>	5	3
6	<p>6. PROJECT TIME MANAGEMENT</p> <p>6.1 Plan Schedule Management</p> <p>6.2 Define Activities.</p> <p>6.3 Sequence Activities.</p> <p>6.4 Estimate Activity Resources.</p> <p>6.5 Estimate Activity Durations.</p> <p>6.6 Develop Schedule</p> <p>6.7 Control Schedule.</p>	6	3
7	<p>7. PROJECT COST MANAGEMENT.</p> <p>7.1 Plan Cost Management.</p> <p>7.2 Estimate Costs.</p> <p>7.3 Determine Budget</p> <p>7.4 Control Costs.</p>	7	3
8	<p>8. PROJECT QUALITY MANAGEMENT</p> <p>8.1 Plan Quality Management.</p> <p>8.2 Perform Quality Assurance.</p>	8	3



	8.3 Control Quality.		
9	<p>9. PROJECT HUMAN RESOURCE MANAGEMENT.</p> <p>9.1 Plan Human Resource Management.</p> <p>9.2 Acquire Project Team</p> <p>9.3 Develop Project Team</p> <p>9.4 Manage Project Team</p>	9	3
10	<p>10. PROJECT COMMUNICATIONS MANAGEMENT.</p> <p>10.1 Plan Communications Management.</p> <p>10.2 Manage Communications.</p> <p>10.3 Control Communications.</p>	10	3
11	<p>11. PROJECT RISK MANAGEMENT</p> <p>11.1 Plan Risk Management.</p> <p>11.2 Identify Risks.</p> <p>11.3 Perform Qualitative Risk Analysis</p> <p>11.4 Perform Quantitative Risk Analysis</p> <p>11.5 Plan Risk Responses.</p> <p>11.6 Control Risks.</p>	11	3
12	<p>12. PROJECT PROCUREMENT MANAGEMENT.</p> <p>12.1 Plan Procurement Management.</p> <p>12.2 Conduct Procurements</p> <p>12.3 Control Procurements.</p> <p>12.4 Close Procurements</p>	12	3



13	13. PROJECT STAKEHOLDER MANAGEMENT	13	3
	13.1 Identify Stakeholders		
	13.2 Plan Stakeholder Management.		
	13.3 Manage Stakeholder Engagement		
	13.4 Control Stakeholder Engagement.		
Textbook:		A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Fifth Edition, Project Management Institute, Project Management Institute © 2013.	

Detailed of Tatorial Contents

	Contents	Week no.	Hours
1	Workshop: Forming Project Team and Project Selection	1	2
2	Workshop: Defining Project Business Case	2	2
3	Workshop: Developing Project Charter	3	2
4	Workshop: Project Configuration & Integration	4	2
5	Workshop: Collect Project Requirements, Creating Project Scope Statement, and Developing Project WBS	5	2
6	Workshop: Developing Project Schedule Using Project Management Tools	6	2
7	Workshop: Developing Project Budget and Cash flow	7	2
8	Workshop: Developing Project Quality Management Plan	8	2
9	Workshop: Developing Project HR Management Plan	9	2
10	Workshop: Developing Project Communications Management Plan	10	2
11	Workshop: Developing Project Risk Management Plan	11	2



12	Workshop: Developing Project Procurement Management Plan	12	2
13	Workshop: Developing Project Stakeholders Management Plan	13	2
Textbook:		A guide to the project management body of knowledge (pmbok® guide), fifth edition, project management institute, project management institute © 2013.	



Department	General Study	Major	All Majors
Course Name	Quality Tools and Applications	Course Code	GMS 438
Prerequisites		Credit Hours (L,W,T)	3 (3,0,2)

Course description :

This course gives the student basic foundation knowledge on Quality Management and its Tools and Applications, this course has been design to help the student to understand the quality concept as a major successful factor for the competitiveness at any sector.

By the end of this course, the student should know when, why and how to apply the quality concepts and tools successfully on his workplace.

Topics :

- Quality Management as a Concept
- Quality Management as a Culture
- Quality Management as a Strategic Planning
- Overview on Quality Management Tools
- ProblemsSolving and DecisionsMaking
- Optimizing and ControllingProcesses
- Implementing the Quality Management

Experiments:if applicable it will support the theoretical topics.

References :

- Introduction to Total Quality Management for Production, Processing and Services. (Sixth Edition)
- By David L. Goetsch and Stanley B. Davis



Detailed of Theoretical Contents

	Contents	Week no.	Hours
1	Quality Management as a Concept: - How Quality is defined. - 8 principles of Total Quality Management. - Customer Satisfaction.	1-3	15
2	Quality Management as a Culture: - Understanding the quality culture VS. the traditional culture - Change management	4-5	10
3	Quality Management as a Strategic Planning: - Developing Plan (vision, mission and objectives) - Execution Plan (action plan, operations, KPIs)	6-7	10
4	Overview on Quality Management Tools: - The basic 7 tools for quality management	8	5
5	Problems Solving and Decisions Making: - Root Cause analysis techniques. - Decision making support techniques.	9-10	10
6	Optimizing and Controlling Processes: - Statistical Process Control (SPC) applications. - Control Charts.	11-12	10
7	Implementing the Quality Management: - Plan, Do, Check, Act (implementation project)	13	5
Textbook:	Quality Management Introduction to Total Quality Management for Production, Processing and Services. (Sixth Edition) By David L. Goetsch and Stanley B. Davis		



Department	General Study	Major	All Majors
Course Name	Engineering Economy	Course Code	GMS 439
Prerequisites		Credit Hours (L,W,T)	(2,0,2)2

Course description :

This course covers the basics of economic analysis from an engineering perspective. The concepts and techniques required to facilitate the evaluation and comparison of investment opportunities on an economic basis are presented, along with the corresponding Excel spreadsheet functions. Topics include: foundations of engineering economy, nominal and effective interest rates, engineering economy factors, present worth analysis, annual worth analysis, rate of return analysis, benefit/cost analysis and public sector economics, breakeven and payback analysis, and depreciation methods.

Topics:

- Foundations of Engineering Economy
- Engineering Economy Factor
- Nominal and Effective Interest Rates
- Present Worth (PW) Analysis
- Annual Worth (AW) Analysis
- Rate of Return (ROR) Analysis
- Benefit /Cost (B/C) Analysis and Public Sector Economics
- Breakeven and Payback Analysis

Experiments: if applicable it will support the theoretical topics.

References :

- William G. Sullivan, Elin M. Wicks, and C. Patrick Koelling, "Engineering Economy", 15th Edition, Printice Hall, ISBN 978-0132554909.
- Jerald J. Thuesen and W. J. Fabrycky, " Engineering Economy", 9th Edition, Printice Hall, ISBN 978-0130281289.



Details of Theoretical Contents			
	Contents	Week no.	Hours
1	Foundations of Engineering Economy: <ul style="list-style-type: none"> - Engineering economics: description and role in decision making process. - How to perform an Engineering Economy study. - Interest rate and rate of return. - Engineering economy terminology and symbols. - Cash flows: estimation and diagramming. - Economic Equivalence. - Simple and compound interests. - Meaning and use of Minimum Attractive Rate of Return (MARR). - Spreadsheets use in engineering economy. 	1-2	4
2	Engineering Economy Factors: <ul style="list-style-type: none"> - Deriving and using the following factors: F/P, P/F, P/A, A/P, F/A, A/F, P/G, and A/G. - Linear interpolation of factors values. - Combining factors (Calculations pertaining to Shifted uniform series and randomly placed single amounts). 	3-4	4
3	Nominal and Effective Interest Rates: <ul style="list-style-type: none"> - Difference between nominal and effective interest rates. - Calculating the effective interest rate. - Equivalence calculations under single and series cash flows in the case where payment and compounding periods are unequal. 	5	2
4	Present Worth (PW) Analysis: <ul style="list-style-type: none"> - Formulating alternatives. - PW analysis of equal- life alternatives. - PW analysis of different- life alternatives. - Future worth analysis. 	6-7	3
5	Annual Worth (AW) Analysis: <ul style="list-style-type: none"> - Advantages and uses of AW analysis. - Calculation of Capital Recovery (CR) and AW values. - Evaluating alternatives by AW analysis. 	8	2



6	<p>Rate of Return (ROR) Analysis:</p> <ul style="list-style-type: none"> - Interpretation of a ROR value. - ROR calculation using a PW or AW relation. - Using ROR analysis to evaluate a single project. - Special considerations when using the ROR method. - Incremental ROR analysis and the issue of inconsistent rankings. - Using incremental ROR analysis to compare two alternatives. - Using incremental ROR analysis to compare several alternatives . 	9-10	5
7	<p>Benefit /Cost (B/C) Analysis and Public Sector Economics:</p> <ul style="list-style-type: none"> - The fundamental differences between public and private sector projects. - B/C analysis for a single project. 	11	2
8	<p>Breakeven and Payback Analysis:</p> <ul style="list-style-type: none"> - Breakeven analysis for a single project. - Payback analysis. 	12	2
9	<p>Depreciation Methods:</p> <ul style="list-style-type: none"> - Definition of asset depreciation. - The Straight Line (SL) method. - The Declining Balance (DB) method. - The unit-of -production (UOP) method. 	13	2
Textbook:		Leland Blank and Anthony Tarquin., " Engineering Economy", 7 th Edition, McGraw-Hill , ISBN 978 – 0073376301.	



Department	Electronics Technology	Major	Biomedical Technology
Course Name	Control Systems for Biomedical Instruments	Course Code	BMT 375
Prerequisites	MAH 325	Credit Hours (L,W,T)	(2,2,0)

Course description :

This course is designed to give the student a basic knowledge of the control system in general. The student has to know how to analyze any electric circuit using the different methods of analysis. Also this course is designed to give the student a basic knowledge of designing the Feedback Systems.

Topics :

- Introduction to Control Systems, Review of Frequency Domain
- Systems Analysis (Laplace Transform, Transfer Function
- Modeling Dynamic Systems (e.g., electrical systems, Biomechanical Systems
- State-Space Analysis (Matrix Algebra, State-Space Representation, Case Study: Pharmacokinetics
- Review of Time Domain Systems Analysis (Poles and Zeros
- Second-Order Systems, Physiological Systems Modeling
- Analysis of Feedback Systems, Feedback Control
- Performance of Feedback Systems: Steady-State Errors
- Physiological Control System Modeling
- Stability and Design of Feedback Systems (Routh-Hurwitz Criterion, Root Locus Techniques, Compensators
- Stability and Design of Feedback Systems via Compensation and Frequency Response Techniques (Nyquist Criterion)
- Design of Feedback Systems via State-Space Techniques (Controllability), Design of Biomedical Systems

Experiments : if applicable it will support the theoretical topics.

References :

1. Norman S. Nise, Control Systems Engineering (John Wiley & Sons, Inc.). ISBN-13: 978-0470646120 | Edition: 6th Edition International Student Version



Detailed of Theoretical Contents			
	Contents	Week no.	Hours
1	Introduction to Control Systems, Review of Frequency Domain Systems Analysis (Laplace Transform, Transfer Function)	3	12
2	Modeling Dynamic Systems (e.g., electrical systems, Biomechanical Systems) State-Space Analysis (Matrix Algebra, State-Space Representation, Case Study: Pharmacokinetics)	3	12
3	-Review of Time Domain Systems Analysis (Poles and Zeros -Second-Order Systems, Physiological Systems Modeling)	1	4
4	Analysis of Feedback Systems, Feedback Control -Performance of Feedback Systems: Steady-State Errors Physiological Control System Modelling	1	4
5	Stability and Design of Feedback Systems (Routh-Hurwitz Criterion, Root Locus Techniques, Compensators) -Stability and Design of Feedback Systems via Compensation and Frequency Response Techniques (Nyquist Criterion) -Design of Feedback Systems via State-Space Techniques (Controllability), Design of Biomedical Systems	3	12

**Textbook:**

1. Norman S. Nise, Control Systems Engineering (John Wiley & Sons, Inc.). ISBN-13: 978-0470646120 | Edition: 6th Edition International Student Version

Detailed of practical Contents

	Contents	Week no.	Hours
1	Introduction to Matlab	1 and 2	2
2	Open loop and close loop transfer function	3	2
3	Laplace Transform	4	2
4	Poles and zeros	5	2
5	First order system	6	2
6	Second order system	7	2
7	PI and PD controllers with motor system	8	2
8	PID controller with motor system	9	2
9	Frequency response (Bode plot)	10	2
10	Root Locus	11	2
11	Routh - Hurwitz	12	2
12	Final assessment	13	2
Textbook:	Lab manual		



Department	Electronics Technology	Major	Biomedical Technology
Course Name	Diagnostic and Therapeutic Medical Equipment	Course Code	BMT 455
Prerequisites	ELC 346	Credit Hours (L,W,T)	(4,0,0)

Course description :

This course is designed to give the student a basic knowledge of the medical equipment in general. The student has to know the principle and fundamentals of diagnostic and therapeutic medical equipments . Also this course is designed to give the student some applications on therapeutic and diagnostic equipments.

Topics :

Bio Amplifiers and signal conditioning circuits.

Diagnostic Equipment.

Monitoring Equipment

Laboratory equipment.

Therapeutic Equipment

Hemodialysis Machine

Heart Lung machine.

Surgical Equipment

Endoscopy

Laser Equipment in Medicine

Sterilization Equipment

Dental Machine

Patient Electrical Safety

Experiments : if applicable it will support the theroticals topics.

References :

1. Introduction To Biomedical Equipment Technology, Fourth Edition; Joseph J. Carr, John M. Brown. 2001 by Prentice-Hall, Inc.3 ISBN-13: 978-0130104922 | Edition: 4
2. Medical Instrumentation; Application and Design, John G. Webster, Publisher John Wiley, Year 2009, Edition 4th edition, ISBN-13: 978-0471676003 | Edition: 4



3. Biomedical Equipment Use, Maintenance and management , Joseph Carr. ISBN-13: 978-0132575775
4. Handbook of Electro medicine , Johannes Patzold-Hienz Kresse, Siemens,John Wiley& Sons. ISBN: 0-07-02134-5
5. Electrotherapy Explained: Principles and Practice, val Robertson ISBN-13: 978-0750688437 | Edition: 4
- Gait Analysis: An Introduction, Michael Whittle ISBN-13: 978-0702042652 | Edition: 5 6.
- 7.Understanding Disability: From Theory to Practice, Michael Oliver ISBN-13: 978-0230220287 | Edition: 2
- 8.Fundamentals of Biomechanics, Ozkaya and M Nordin 2nd Edition, Springer, New York, 1999. ISBN-13: 978-1461411499 | Edition: 3rd ed. 2012



Department	Electronics Technology	Major	Biomedical Technology
Course Name	Biomedical Digital Signal processing	Course Code	BMT 456
Prerequisites	ELC 335	Credit Hours (L, W, T)	(2,0,2)

Course description :

This course is designed to give the student a basic knowledge of the fundamental ideas of biomedical signals in general. The student has to know how to using the different methods of filters on biomedical digital signal processing. Also this course is designed to give the student some application.

Topics :

Discrete Signals and Systems

Discrete Fourier Transforms

FIR Filter Design

IIR Filter Design

Finite Word Length Effects

Multi-rate Digital Signal Processing

Multi-rate Filter Banks

DSP Algorithm Implementation

Application of DSP in Biomedical Signals

Experiments : if applicable it will support the theoretical topics.

References :

Discrete-Time Signal Processing. Oppenheim A., Schafer R., and Buck J. Publisher Prentice Hall. Year 1999, Edition 3rd edition. ISBN-13: 978-0131988422 | Edition: 3

Biomedical Signal Processing and Signal Modeling. Bruce, E.N. John Wiley and Sons, Inc., 2000. ISBN: 978-0-471-34540-4

Biomedical Digital Signal Processing. Tompkins W. J., , Prentice Hall, 1993. ISBN: 9781439870334

Digital Signal Processing. Proakis J. and Manolakis, 2007, 4th edition, Pearson Education, ISBN-13: 978-0131873742 | Edition: 4



Detailed of Theoretical Contents			
	Contents	Week no.	Hours
1	Discrete Signals and Systems Discrete Fourier Transforms	3	12
2	FIR Filter Design IIR Filter Design	3	9
3	Finite Word Length Effects Multi-rate Digital Signal Processing Multi-rate Filter Banks	2	6
4	DSP Algorithm Implementation Application of DSP in Biomedical Signals	4	12
Textbook:		1. Digital Signal Processing. Proakis J. and Manolakis, 2007, 4th edition, Pearson Education, ISBN-13: 978-0131873742 Edition: 4	



Detailed of Theoretical Contents			
	Contents	Week no.	Hours
1	Bio Amplifiers and signal conditioning circuits. Diagnostic Equipment. Monitoring Equipment	3	12
2	Laboratory equipment. Therapeutic Equipment	2	8
3	Hemodialysis Machine Heart Lung machine.	2	8
4	Surgical Equipment Endoscopy Laser Equipment in Medicine	2	8
5	Sterilization Equipments Dental Machine Patient Electrical Safety	2	8
Textbook:		1. Medical Instrumentation; Application and Design, John G. Webster, Publisher John Wiley, Year 2009, Edition 4th edition, ISBN-13: 978-0471676003 Edition: 4 2-Fundamentals of Biomechanics, Ozkaya and M Nordin 2nd Edition, Springer, New York, 1999. ISBN-13: 978-1461411499 Edition: 3rd ed. 2012	



Department	Electronics Technology	Major	Biomedical Technology
Course Name	Medical Information Systems	Course Code	BMT 457
Prerequisites		Credit Hours (L, W, T)	(2,0,0)

Course description :

This course is designed to give the student a basic knowledge on information system in general. The student has to know how to represent and uses of data. Also this course is designed to give the student a basic knowledge of medical information system .case study will present in this course.

Topics :

-Introduction to biomedical informatics ◊

-Basic medical practices, terminology, work flow systems, laws, regulations, and the significant underlying safety, efficiency.

-Basics of Professional and Commercial Information Technologies

-Representations and uses of Data ◊

-Human and Cultural aspects of health, illness, science, and human performance, Conclusions, integration, interpretation, synthesis, &hypothesis

-Case study

Experiments : if applicable it will support the theroticals topics.

References :

Biomedical Informatics: Computer Applications in Health Care and Biomedicine, Edward H. Shortliffe, James J. Cimino ISBN-13: 978-0387289861 | Edition: 3rd, March 23, 2012



Detailed of Theoretical Contents			
	Contents	Week no.	Hours
1	Introduction to biomedical informatics ‘ -Basic medical practices, terminology, work flow systems, laws, regulations, and the significant underlying safety, efficiency. -	5	10
2	Basics of Professional and Commercial Information Technologies -Representations and uses of Data, -	5	10
3	Human and Cultural aspects of health, illness, science, and human performance, Conclusions, integration, interpretation, synthesis, &hypothesis	4	8
4	-Case study	5	10
Textbook:		1. Biomedical Informatics: Computer Applications in Health Care and Biomedicine, Edward H. Shortliffe, James J. Cimino ISBN-13: 978-0387289861 Edition: 3rd, March 23, 2012	



Department	Electronics Technology	Major	Biomedical Technology
Course Name	Medical Imaging Systems	Course Code	BMT 458
Prerequisites	BMT 455	Credit Hours (L, W, T)	(2,0,0)

Course description :

This course is designed to Introduce the student to an introduction to medical imaging system and a basic knowledge about some of medical imaging system equipment's , and how it works .

Topics :

X-ray-

X-ray principles

Hardware of x ray machine

Computed tomography (CT- (

Principles of CT Operation of CT

-Ultrasound

Ultrasound production & applications

Magnetic resonance imaging (MRI)

magnetic resonance principles

clinical MRI imaging systems and hardware

Safety precautions

Experiments : if applicable it will support the theroticals topics.

References :

Ultrasound in Medical Diagnosis White, D. N. ISBN13 9780718610012

Physical Principles of Ultrasound Nyborg WL ISBN 91-38-04082-4

Medical Instrumentation Application and Design John Webster ISBN-13: 978-0471676003

An Introduction to the Physics and Function of Magnetic Resonance

Imaging, .Weishaupt D., Koechli V.D., Marincek B. ISBN: 9783540300670

Handbook of X-Ray Data Publisher: Springer 2007 ISBN: 3540286187 | edition 2007

Basic X-ray Machine Operator Study Guide Gary Tomaszewski ASIN: B000NJJ36A



Detailed of Theoretical Contents

	Contents	Week no.	Hours
1	X-ray principles Hardware of x ray machine Safety precautions	3	6
2	Computed tomography (CT- (Principles of CT Operation of CT	4	8
3	Ultrasound Ultrasound production & applications	6	12
4	Magnetic resonance imaging (MRI) magnetic resonance principles clinical MRI imaging systems and hardware	6	12
Textbook:		1. Medical Instrumentation Application and Design John Webster ISBN-13: 978-0471676003 2- Ultrasound in Medical Diagnosis White, D. N. ISBN13 9780718610012	



Department	Electronics Technology	Major	Biomedical Technology
Course Name	Biomedical Digital Image processing	Course Code	BMT 459
Prerequisites	BMT 456	Credit Hours	(2,0,0)
		<i>(L, W, T)</i>	

Course description :

This course is designed to give the student a basic knowledge of the Biomedical Digital Image processing. The student has to know the principal of imaging. Also this course is designed to give the student an Application of digital image processing in Biomedical Images.

Topics :

Digital Image Fundamental & Transforms

Image Enhancement Technique

Image Restoration

Image Compression

Image Segmentation & Representation

Image Algorithm Implementation

Application of digital image processing in Biomedical Images

Experiments : if applicable it will support the theoretical topics.

References :

1-Digital Image Processing. Gonzales R and Woods R., Publisher Prentice Hall Year 2008,3rd edition. ISBN-10: 0131453610.

2-Digital image processing using Matlab , Gonzales R, Woods R., and Eddins S., , 3nd edition, Prentice Hall 2008, ISBN-13: 978-0130085191

3-Digital image processing, Bernd Jahne 5th edition 2002 ISBN-13: 978-3540677543 | Edition: 5th rev. and extended ed



Detailed of Theoretical Contents			
	Contents	Week no.	Hours
1	Digital Image Fundamental & Transforms Image Enhancement Technique	4	12
2	Image Restoration Image Compression	3	9
3	Image Segmentation & Representation Image Algorithm Implementation	2	6
4	Application of digital image processing in Biomedical Images	4	12
Textbook:		1. Digital Image Processing. Gonzales R and Woods R., Publisher Prentice Hall Year 2008,3rd edition. ISBN-10: 0131453610.	