October University for Modern Sciences and Arts

FACULTY OF ENGINEERING

Undergraduate Curriculum Plan

for

Computer Systems Engineering Programme

2018/2019

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CHAPTER I

FACULTY REQUIREMENTS

The faculty of Engineering at MSA University consists of a number of Scientific Departments, and offers certain Academic Degrees.

1.1 Administrative Regulations:

The Administrative Regulations are governed by Article 1 through 4.

Article 1: Faculty Departments.

The faculty of Engineering consists of the following Departments:

- Department of General Systems Engineering.
- Department of Architectural Systems Engineering.
- Department of Electrical Systems Engineering.
    - Communication and Electronics Disciplines.
    - Computer Systems Engineering Discipline.
- Department of Industrial Systems Engineering.
- Department of Mechatronics Systems Engineering.

Article 2: Subject Areas.

The following subject areas are assigned to the relevant Faculty Departments for teaching and carrying out research work:

- **Department of General Systems Engineering:** Engineering Mathematics, Engineering Physics, Modern Physics, Chemistry, Engineering Mechanics, Engineering Drawing, and Computer Programming.
- **Department of Architectural Systems Engineering:** Architectural Design, Architecture History and Theories, Architecture Graphics, Architecture Computer Graphics, Building Construction, Working Drawings, Urban Planning and Design, Landscape Design, Interior Design, Environmental Control Systems, Technical Service Systems, Construction Management, Professional Practices and Building Regulations, Housing Planning and Design, Engineering Surveying, Properties and Strength of Materials, Structural Analysis, Reinforced Concrete Structures, Steel Structures.
- **Department of Electrical Systems Engineering: Communication and Electronics Disciplines.** Electric Circuit Analysis, Physics of Electrical Materials, Solid State Devices, Digital Logic Design, Electronic Circuit Analysis, Electromagnetic, Linear Systems, Electrical Measurement Instruments, Data Communication, Automatic Control Systems, Communication Systems, Microwave Engineering, Information Theory and Coding, Energy Conversion, Digital Systems Interfacing, Antenna Theory and Design, VLSI Design, Fiber Optics and Laser Technology, and Microwave Devices**. Computer Systems Engineering Discipline.** Algorithms and Data Structure, Operating Systems, Computer Systems,

Computer Networks, Concepts of Programming Languages, Microprocessor Systems, Computer Security, Artificial Intelligence, Fundamental of Data Base Systems, and Software Engineering.

- **Department of Industrial Systems Engineering:** Workshop Technology, Engineering Materials, Engineering Measurements, Thermodynamics and Heat Transfer, Fluid Mechanics, Electricity, Electronics, Stress Analysis, Machine Design, Tool Design, Product Development and Design, Traditional and Advanced Manufacturing Processes, CNC Machines and CAD/CAM, Engineering Economic Analysis, Operations Research, Work Analysis and Measurements, Facilities Planning and Design, Statistical Quality Control, Quality Management and Assurance, Production Planning and Control, Maintenance Planning and Control, Lean Six-Sigma Manufacturing Systems, Project Management Systems, Simulation Modeling and Analysis, Robotics and Automatic Control Systems, and Design of Experiments.
- **Department of Mechatronics Systems Engineering:** Engineering Materials, Computer Programming, Thermodynamics, Electric Circuits, Stress Analysis, Machine Elements Design and Drawing, Electronic Circuits, Manufacturing Processes, Fluid Mechanics, Numerical Analysis, Sensors and Data Acquisition System, Machine Design, Heat Transfer, Electric Drive Systems, Digital Logic Control, Numerical Control Machines and CAD/CAM, Vibration, Mechatronics Modelling and Simulation, Hydraulic and Pneumatic Control, Automatic Control, Robotics, Industrial Automation, Artificial Intelligence, Microprocessors and Microcontrollers, Mechatronics System Design, Troubleshooting of Mechatronics System, Embedded Computer Systems, Digital Signal Processing, Noise and Acoustic Control, Renewable Energies, and Computer Computer Networks.

Article 3: Non-Engineering Modules.

The Dean supervises the non-engineering modules such as Computer Programming Courses, Social Sciences and Humanities Courses, and English Proficiency Courses.

Article 4: Awarded Degrees.

MSA University, upon the request of the faculty of Engineering Council, awards the Bachelor of Science in one of the following offered engineering disciplines:

- Architectural Engineering.
- Electrical Communication and Electronics Systems Engineering.
- Computer Systems Engineering.
- Industrial Systems Engineering.
- Mechatronics Systems Engineering.

1.2 Scientific Regulations:

The Scientific Regulations are governed by Articles 5 through 14.

Article 5: Completion of Curriculums.

Students in any engineering programme are awarded a degree upon the successful completion of an accredited curriculum, cannot be completed in less than 9 main semesters (four years and half).

Article 6: Educational System.

Students' programmes are based on a credit hour semester system. The programmes are offered over two 15-week semesters in the fall and spring, in addition to an optional 7- week summer session with total learning hours comparable to the main semesters.

Article 7: Programme Credits.

Students in any Engineering Programme are awarded the B.Sc. degree upon a successful completion of an accredited curriculum comprised of 56 courses with 168 credits. Architecture program, however, consists of 54 courses with 168 credits.

Article 8: Contact Hours.

The Faculty of Engineering adopts the following equivalence system:

- 1 contact hour Lecture per week is equivalent to 1-Credit hour.
- 2 contact hours Tutorial per week are equivalent to 1-Credit hour.
- 3 contact hours Laboratories or Workshop or Studio per week are equivalent to 1-Credit hour.

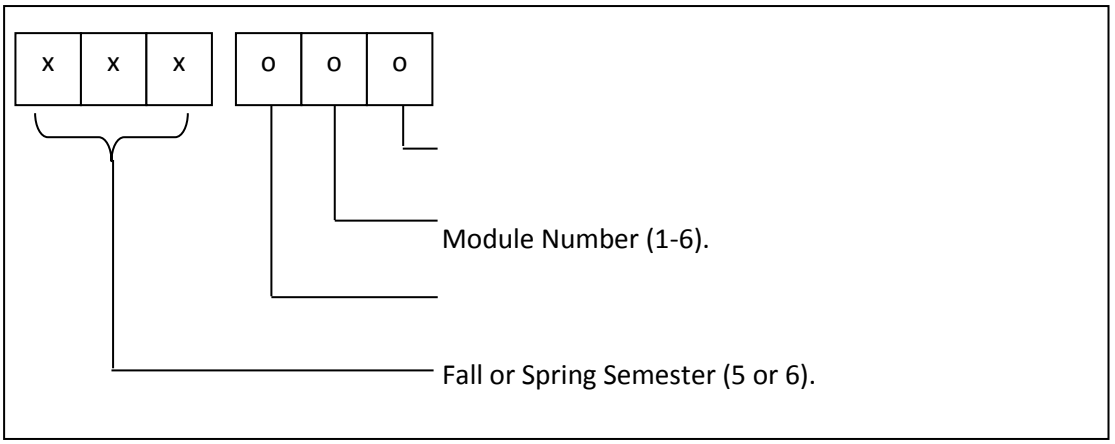
Article 9: Examination Times.

Students sit for 1.5-hr. written Mid-Term Exam, and 3-hr. written Final Exam in each course, except for Architectural modules, some of them have no Mid-Term Exam, and the time of final examination ranges between 3 and 6 hrs. (The Following Module the Students sit for 6-hr Final Exam: All Architectural Designs Module, All Working Drawings Module, Urban Planning and Design and Housing Planning and Design).

Article 10: Module Codes.

Students register a number of modules each semester according to associated codes. The offered courses are coded by three alphabetical letters followed by three digits. The code designation is as follows:

Scientific Module Code



Scientific Discipline and Subject Area Code

Scientific Discipline Code	Subject Area Code	
	MAT	Engineering Mathematics Modules.
	BSC	Basic Sciences Modules.
	GSE	General Engineering Modules.
	COM	Computer Programming and Graphics Modules.
	HUM	Humanity Modules.
	ENG	English Proficiency Modules.
ASE		Architecture Engineering Discipline Modules.
	CVL	Civil Engineering Modules.
ECE		Electrical Communication and Electronic Systems Engineering Discipline Modules.
CSE		Computer Systems Engineering Discipline Modules.
	ESE	Electrical Systems Engineering Modules.
ISE		Industrial Systems Engineering Discipline Modules.
	DES	Design Engineering Modules.
	MFG	Manufacturing Engineering Modules.
MSE		Mechatronics Systems Engineering Modules.

Article 11: Programme Analysis.

Students' programmes are analyzed in scientific blocks: Basic Sciences, Basic Engineering, Applied Engineering (according to a specific discipline), as well as Social Sciences and Humanities. Each programme is also analyzed in terms of input/output, breadth/depth, and percentages of subject-area blocks to ensure the balance of courses in each programme.

Article 12: Study Programmes.

Students' programmes are tabulated in certain sets of courses per semester, along with associated codes, number of credits, as well as contact hours per week for lectures, tutorials, laboratories, and studios, if any.

Article 13: Module Outlines.

Students' programmes are displayed into Module outlines. The Faculty Council approves the module outlines upon their determination by the relevant Scientific Departments. These outlines include the Scientific Contents (Aims and Syllabus), Learning Outcomes (Knowledge and Skills), Teaching Learning Strategies, Learning Materials, Reference Text, Supplementary Readings, Assessment Scheme, Assessment Pattern, Learning Unit Contact Hours, and Module Leader.

Article 14: Teaching Aids.

Students must use all their senses to gain as much knowledge as they can through various Teaching Aids such as Scientific and Engineering Laboratories, Computer Services, Main Library equipped with computer terminals, and Audio-Visual Aids.

1.3 Academic Regulations:

The Academic Regulations are governed by Articles 15 through 35.

Article 15: Student Admission.

Students who apply to the Faculty of Engineering at MSA must abide by the certain regulations. Refer to University Regulations and Regulations Documents.

Article 16: Disciplines Distribution.

Students join one of the offered programmes according to the various discipline distribution over the academic 5-year plan. This is as follows:

<table>
<tr><th>Year</th><th colspan="5">Disciplines</th></tr>
<tr><td>First</td><td colspan="5">General Engineering</td></tr>
<tr><td>Second</td><td colspan="2">Basic Electrical Engineering</td><td rowspan="4">Industrial Systems Engineering</td><td rowspan="4">Mechatronics Systems Engineering</td><td rowspan="4">Architecture Systems Engineering</td></tr>
<tr><td>Third</td><td rowspan="3">Electrical Communication and Electronic Systems Engineering</td><td rowspan="3">Computer Systems Engineering</td></tr>
<tr><td>Fourth</td></tr>
<tr><td>Fifth</td></tr>
</table>

Article 17: Academic Load.

Students are allowed to register for a number of modules in each semester according to their cumulative Grade Point Average (CGPA), and Faculty Regulations, as follows:

Discipline	**General Engineering**	**1- Industrial Systems Engineering 2- Mechatronics Systems Engineering 3- Electrical Communication and Electronic Systems Engineering 4- Computer Systems Engineering**	**Architecture Systems Engineering**		**All Discipline**
Levels	**1st**	**2nd - 4th**	**2nd – 3rd**	**4th**	**500**
CGPA	**# of Courses**	**# of Courses**	**# of Courses**	**# of Courses**	**# of Courses**
From 0.00 – 0.99	4	4	4	3	3
From 1.00 – 1.99	5	5	5	4	3
From 2.00 – 4.00	6	6	6	5	4

Article 18: Adding and Dropping Modules.

Students should follow the University Academic Calendar in Adding and/or dropping modules. The student who wishes to drop/add module(s) is required to fill in a form, get the signature of his/her advisor, and then the approval of the Dean.

Article 19: Withdrawal Modules.

Students may withdraw from a module after having a written signature of both module's instructor and student's advisor, and then the approval of the Dean. Should the instructor or advisor refuse to sign the withdrawal form; the student may appeal to the Dean who shall make the final decision after consultation with those who declined to sign the withdrawal.

Three valid reasons for withdrawal should be observed:

- **Instructor responsibility:** If a student is not doing well in a module or his attendance is less than the permitted percentage, he may be advised not to remain in the module after the Mid-Term exam.
- **Unavoidable interruption:** If a properly documented illness, accident, or other unavoidable event interrupts a student's academic routine, a withdrawal could be considered for load reduction.
- **Change of major:** If an engineering student is transferring from his major to another within the Faculty of Engineering, and the appropriate transfer is completed, consideration will be given for a withdrawal.

Article 20: Attendance Requirements.

Students who fail to attend 75% of all contact hours for a certain module, are deprived from the Final Exam and automatically fail the module. Upon the request of the Department Council, the Faculty Council issues a resolution depriving these students from the module. This includes absences for unavoidable event that interrupts a student's academic routine.

Article 21: Student Portfolios.

Students are required to keep a portfolio for each course which is a purposeful collection of his or her coursework, assessment work, term papers and/or projects. Combined, this serves to show the student's academic progression and development as they undertake the program. The staff will review the student's portfolio at the end of the semester. The portfolios are reviewed by External Examiners during the Assessment visit.

Article 22: Module Assessment.

Students are evaluated in each module on the basis of 100 points divided into the following:

40 % Module Work (participation, assignments, quizzes, tests, case studies, and/or mini-projects).

20 % Written Mid-Term Exam (with secret codes).

40 % Written Final Exam (with secret codes).

However, Architectural Design courses have no mid-term exam. Module work becomes 60%, which covers participation and performance in studios, developmental sketches and critiques, as well as the final juries comprising external examiners and the staff of the Architectural Engineering Department. The juries evaluate the students' final presentation as well as their developmental process through their portfolios. The final 40% is appointed for the Final Exam.

Article 23: Graduation Project

Students are required to conduct an independent study for two semesters at the fifth year under the supervision of a faculty member(s) as an Advisor and a teaching assistant(s). The objective is to provide the student with an opportunity to integrate and apply the knowledge gained throughout his or her modules in a real-life system. Each student must document graduate project in a technical report, and give an oral presentation in front of Internal and External Examiners. Prerequisite is a completion of 138-credit hours minimum and a cumulative GPA of not less than 2. The regulation of performing the graduation project may be looked at in the Graduate Project Student Manual (GPSM).

Article 24: First Marking.

Students' answer sheets are marked firstly by the associated module instructors under the supervision of module coordinators. Staff usually mark answer sheets of Mid-Term and Final Exam with secret codes to ensure that the marking process is totally unbiased.

Article 25: Second Marking.

A minimum sample of 10% of all answer sheets shall be remarked including 5% of all passed papers plus all failures. Remarking is undertaken by an internal examiner other than the module examiner. In the event that a second marker decides upon different marks for any of the papers remarked, he consequently submits a report addressed to the Programme Assessment Board to such effect for a conclusive arbitration by the Board.

Article 26: Marking Coordination.

Model answers are provided by Module Coordinators as a guide for moderation. In the event that discrepancy arises between the examination marks of both Mid-Term and finals of a student, whereby such student passes his or her examinations and fails his or her course work or vice versa, or in the event

that there is a high mean difference of 25% or more between the module work grade and the examination grades. Such events are investigated by the Programme Assessment Boards.

Article 27: External Examiners.

External examiners review exams and answer sheets with staff to insure the fairness and objectivity of the assessment process.

Article 28: Failure in Modules.

- Students must meet the deadline for submission of all module work components and according to the requirements of the university and module staff.
- Students who fail to attend the final exam of a module will fail this module.
- Students, who fail to achieve 30% from the marks in the final exam, will fail this module.
- Students who fail to attend the Mid-Term Exam will not be deprived from completing the module, but will lose the marks of the Mid – Term exam.
- Students, who fail to achieve 60% from the total marks, will fail this module.

Article 29: Incomplete Modules.

Students who fail to attend the Final Exam for any emergency or exceptional circumstances, the University President may approve an incomplete grade. Following up examinations to be set for students given an "I" grade and transferring module work for such students to the semester they are re-sitting such examination in. Subsequently, the student will be allowed to set for the Final Exam of this module at the next opportunity.

Article 30: Repeat Policy.

- A student is allowed to repeat passed modules to improve his cumulative GPA by repeating the whole modules (course work, midterm exam, final exam), the grade used in the final cumulative GPA is the final grade achieved by the student. Repeating modules for improvement is allowed for a maximum 5 modules unless the improvement is for getting out of probation. The two (or more) grades of repeated modules are recorded in the student transcript.
- If a student repeats a module because he failed it before, the maximum grade that he can obtain in the repeat is B+. The two (or more) grades of repeated modules are recorded in the student transcript.

Article 31: GPA Calculation.

The cumulative GPA calculation for each student starts from the first semester, and is updated each semester till his or her graduation. The best achieved GPA will be used for calculating the cumulative GPA.

- The semester GPA for each student is the weighted average of the grade points acquired in the module passed in that specific semester. It is calculated as follows:

$$Semester\,GPA = \frac{\sum_{x=1}^{n}\left[\left(Course\,Credit\ Hours\ for\ Specific\ Semester\right)\left(Course\,GPA\right)\right]}{\sum_{x=1}^{n}\left[Course\,Credit\ Hours\ for\ that\ Semester\right]}$$

  Where, n is the number of modules registered by the student in a specific semester.

- The cumulative GPA for each student is the weighted average of the grade points acquired in all modules passed up till that point in time. It is calculated as follows:

$$Cumulative\,GPA = \frac{\sum_{x=1}^{m}\left[\left(Course\,Credit\ Hours\ passed\ up\ till\ that\ Point\right)\left(Course\,GPA\right)\right]}{\sum_{x=1}^{m}\left[Course\,Credit\ Hours\ for\ those\ passed\ up\ till\ that\ Point\right]}$$

  Where, m is the number of modules passed by the student up till that point in time.

Article 32: Final Grades.

Students receive a grade point average for each course according to the following letter grades; percentage ranges, GPA, and associated UK classes:

UoG Classes	MSA CGPA	Letter Grade Equivalence
1st Class Honour	**≥ 3.67 and ≤ 4**	**A and A-**
Upper Second (2:1) Honour	**≥ 2.67 and < 3.67**	**B+ , B and B-**
Lower Second (2:2) Honour	**≥ 2.33 and < 2.67**	**C+**
3rd Class Honour	**≥ 2 and < 2.33**	**C**

Grade	Range	GPA	Award
A	≥ 93	4.00	EXCELLENT
A-	≥ 89 and < 93	3.67	
B+	≥ 84 and < 89	3.33	VERY GOOD
B	≥ 80 and < 84	3.00	
B-	≥ 76 and < 80	2.67	GOOD
C+	≥ 73 and < 76	2.33	
C	≥ 70 and < 73	2.00	PASS
C-	≥ 67 and < 70	1.67	PASS Conditional PASS if CUM GPA is ≥ 2
D+	≥ 64 and < 67	1.33	
D	≥ 60 and < 64	1.00	
F	< 60	0.00	FAIL
F(1)	< 60 Deprived from final exam	0.00	
F(2)	< 60 Absent in the final exam	0.00	
F(3)	< 60 Achieved < 30% in final exam	0.00	

Grades that are not included in the grade point average are as follows:

P Pass.

I Incomplete.

W Withdraw.

Article 33: Academic Probation.

Students under probation are those who fail to achieve a CGPA 2. Initially the student is notified and counseled by his/her faculty via his/her academic advisor and an official letter is sent to his/her parents. Probation students are dismissed if they remain under probation for six consecutive main semesters, ten nonconsecutive main semesters, or if they fail to achieve the requirements for the graduation within the maximum limit of study which is 10 years. Withdrawal semesters and semesters of ENG80 and ENG 90 are not countable. Spring and summer semesters are counted as one semester. The Student is allowed to change major only once. In case the probation student has achieved 80 % of the required credit hours equivalent for graduation, he can get an extra one year over the maximum limits for graduation.

Article 34: Academic Honors.

Students with a cumulative GPA of 3.33 to 3.67 are awarded MSA's honors. Those who receive above 3.67 are granted MSA highest honors award.

Article 35: Summer Training.

Students are required to spend a minimum of total 8-week training in local or foreign organization (s) during the summer of the second, third and/or fourth year of study. The training, which should be under the supervision of a faculty member, provides students with an exposure to real-life systems. An official certificate, from which the training is executed, should be submitted to the associated department. The student should not be graduated, unless he or she receives this industrial training. A detailed report should be submitted to the department, presented in a non-credit seminar, and evaluated by the staff. Prerequisite is a completion of 70-credit hours minimum.

CHAPTER II

PROGRAMME ANALYSIS

Computer Systems Engineering (CSE) is concerned with the theory, design, implementation, and application, both actual and potential, of various devices and systems based on computer software and hardware phenomena and prosperities.

Computer programme consists of several doses in English Language Computer Science, Social Sciences, in addition to Electrical Communications and Electronics and Computer Engineering disciplines, and elective courses, from the offered list.

The following is the analysis of the Computer Systems Engineering Programme into Subject-Area Blocks enumerating the modules in each block.

I- Advanced Mathematics:

Students are required to take a solid foundation in Mathematics over six semesters (3 academic years). This is executed by a two-module sequence in Calculus and by individual modules in Probability and Statistics, Linear Algebra, Differential Equations, and Numerical Analysis.

MAT 151	Calculus I
MAT 161	Calculus II.
MAT 251	Linear Algebra
MAT 261	Differential Equations
MAT 351	Mathematical Analysis and Numerical Methods
MAT 361	Probability and Statistics

New comers are given extra tutorial sessions in Calculus for remedial preparation.

II- Basic Sciences:

Students are required to take a number of specially designed modules to provide them with a solid background in Engineering Physics, and Computer Programming.

BSC 152	Engineering Physics I.
BSC 162	Engineering Physics II.
BSC 252	Modern Physics.
COM 155	Introduction to Information Technology.
COM 255	Engineering Computer Programming I.
COM 265	Engineering Computer Programming II.

III- Engineering Fundamentals Breadth:

Students are required to take basic subjects to give them breadth in Engineering fundamentals, as well as a solid foundation in Design and Manufacturing.

- **Basic Engineering Modules:**

GSE 153	Engineering Mechanics I.
GSE 163	Engineering Mechanics II.
BSC 164	Chemistry.

- **Electrical Engineering Modules:**

ESE 253	Electric Circuit Analysis I.
ESE 262	Physics of Electrical Materials.
ESE 263	Electric Circuit Analysis II.
ESE 551	Electrical Energy Conversion.

- **Communications and Electronics Modules:**

ECE 254	Digital Logic Design I.
ECE 264	Digital Logic Design II.
ECE 353	Electronic Circuits Analysis I.
ECE 355	Data Communication.
ECE 356	Electronic Measurements Instruments.
ECE 365	Linear Systems.
ECE 363	Electronic Circuits Analysis II.
ECE 455	Automatic Control Systems.
ECE466	Digital Signal Processing

IV- Computer Engineering Core

Students are required to take a number of comprehensive modules designed to provide the essential subject matter in the major area.

CSE 352	Microprocessor Systems.
CSE 354	Algorithms and Data Structure.
CSE 362	Digital System Interfacing.
CSE 364	Operating Systems.
CSE 451	Concepts of Programming Languages.
CSE 452	Software Engineering.
CSE 454	System Analysis and Design.
CSE 456	Computer Architecture.

CSE 461	Computer Security.
CSE 366	Computer Networks
ECE 465	Information Theory and Coding
ECE552	Mobile Communication System
ECE 561	VLSI Design.

V- Social Science:

Students are required to take two modules (6 credit hours).

HUM 266	Project Management Systems.
HUM 562	Ethics, Safety and Health
HUM5535	Entrepreneurship and Small Business Management

VI- English Language Proficiency:

Students are required to take three modules in English Language to enhance their reading and writing skills. These modules are offered by the Faculty of Languages.

ENG 156	Academic English Writing.
ENG 166	Technical English Writing.
ENG 256	Research English Writing.

VII- Computer Systems Engineering Electives:

Students majoring in CSE shall choose 4 courses (12 credit hours) to support the graduation project which will be in one of the following two areas:

- Intelligent Systems
- Multimedia and Internet Computing

The courses are selected from the following two lists of modules:

Intelligent Systems	Multimedia and Internet Computing
CSE 4531: Industrial Electronics in Practice. CSE 4532: Advanced Operating Systems. CSE 4631: Cryptography. CSE 4632: Human Computer Interaction. CSE 5531: Web Design Concepts. CSE 5532: Advanced Database Systems. CSE 5631: Spread Spectrum Techniques. CSE 5632: Neutral Networks. CSE 5635: Advanced Artificial Intelligence	CSE 4533: Robot Dynamics and Control. CSE 4534: File Access and Management. CSE 4633: Theory of Computing. CSE 4634: Digital Image Processing. CSE 5533: Speech Signal Processing. CSE 5534: Special Topics in Electronics. HUM5535: Entrepreneurship and Small Business Management CSE 5633: Compiler Design. CSE 5634: Special Topics in Computer Engineering CSE 5636: Advanced Topics in Computer Engineering

VIII- Graduation Project:

Students are required to register 6 credit hours in two successive semesters – after a completion of a minimum of 138 credit hours and a cumulative GPA of not less than 2 for conducting a graduating project.

CSE 554	Graduation Project (Part I)
CSE 564	Graduation Project (Part II)

For further analysis of the curriculum, the CSE programme is presented in terms of: Input/Output, Breadth/Depth, and Percentage of subject-area blocks.

VIII- Business Management:

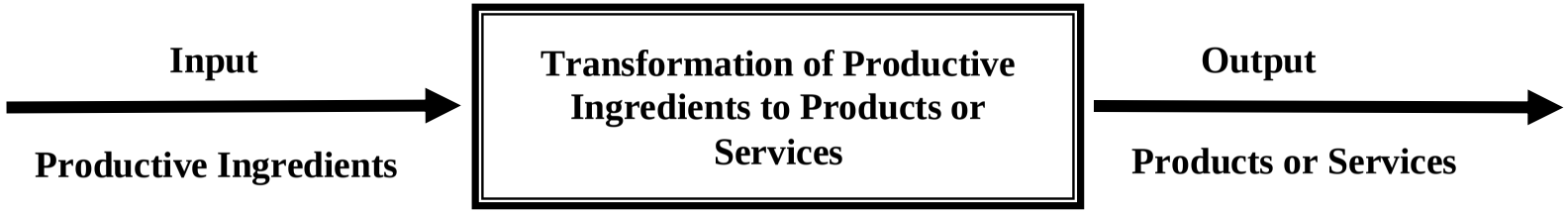
Students are required to take a number of comprehensive modules designed to provide essential subjects in the area of Business Management:

CSE 462a	Fundamental of Data Base Design.
CSE 464a	Artificial Intelligence.

IX- Engineering Culture:

Students are required to take a number of comprehensive modules designed to provide essential subjects in the area of Engineering Culture:

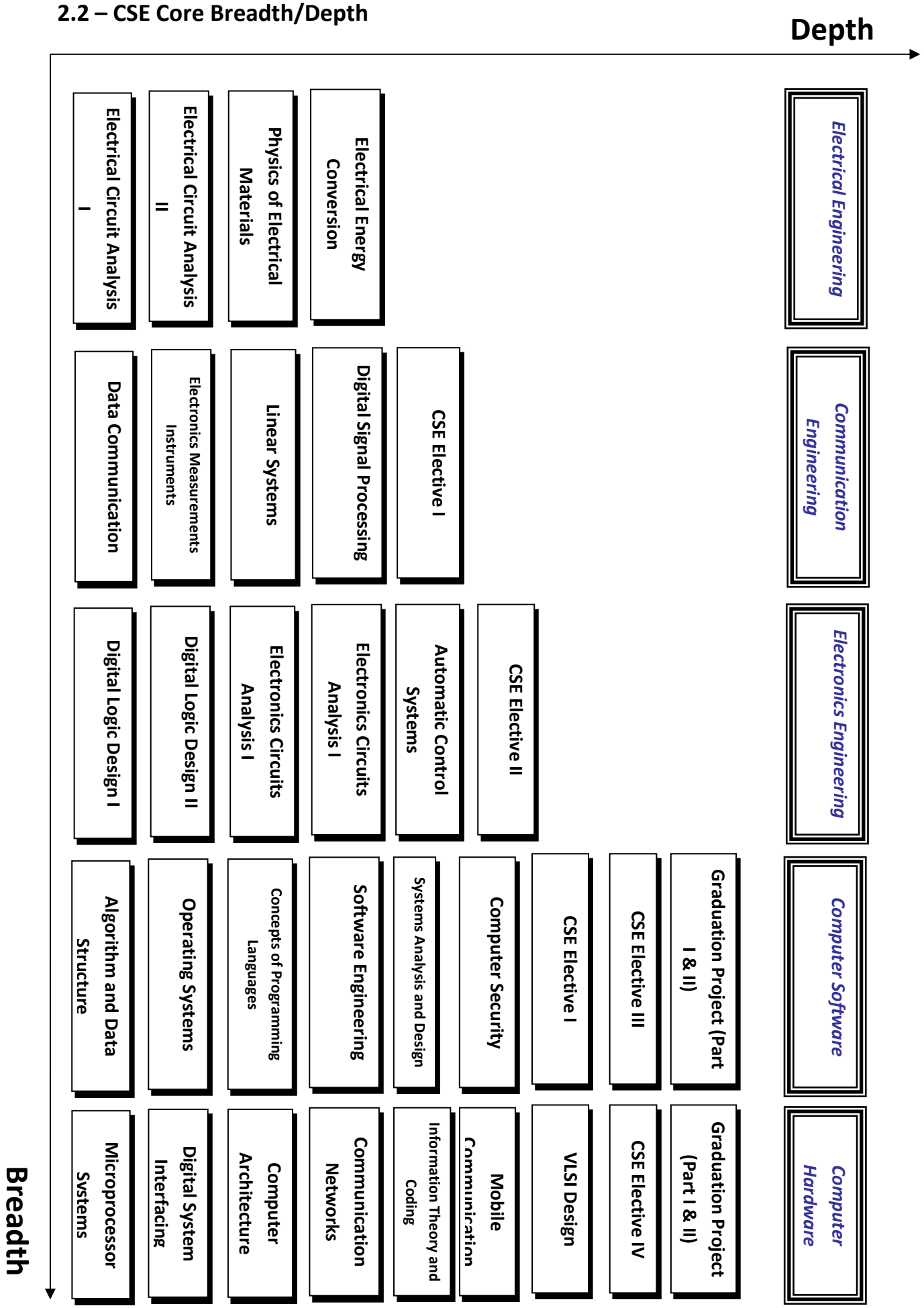
GSE 154n	Engineering Drawing.
GSE 165	Workshop Technology.



2.1 – Computer System Engineering Input/Output:

Communication Networks	Mobile Communication System			
Operating Systems	Computer Architecture			
Digital System Interfacing	System Analysis and Design	Elective II	Elective III	
Algorithms and Data Structure	Software Engineering	Information theory and Coding	Elective IV	
Microprocessor Systems	Concepts of Programming Languages	Computer Security	VLSI Design	

2.2 – CSE Core Breadth/Depth



2.3 CSE Subject-Area Blocks:

	No.	Subject-Area Blocks	Courses		Credits	
			Subtotal	Percentage	Subtotal	Percentage
1- Math and Basic Sciences	1.1	Mathematics	6	50 %	18	50 %
	1.2	Basic Sciences	6	50 %	18	50 %
		SUBTOTAL	**12**	**100 %**	**36**	**100 %**
2- Engineering Fundamentals	2.1	Basic Engineering	3	18.75 %	9	18.75 %
	2.2	Electrical Engineering Modules	4	25.00%	12	25.00%
	2.3	Communications and Electronics Modules	9	56.25 %	27	56.25 %
		SUBTOTAL	**16**	**100 %**	**48**	**100 %**
3- Computer Engineering	3.1	CSE Core	13	81.25 %	39	81.25 %
	3.2	CSE Elective	3	18.75 %	9	18.75 %
		SUBTOTAL	**16**	**100 %**	**48**	**100 %**
4- Graduation Project			**2**	**100 %**	**6**	**100 %**
5- Humanities and English Proficiency	5.1	English Proficiency	3	50 %	9	50 %
	5.2	Humanities	3	50 %	9	50 %
		SUBTOTAL	**6**	**100 %**	**18**	**100 %**
6- Business Management			**2**	**100 %**	**6**	**100 %**
7- Engineering culture			**2**	**100 %**	**6**	**100 %**
TOTAL			**56**	**100 %**	**168**	**100 %**

No.	Subject-Area Blocks	Courses		Credits		Reference set by Engineering Sector Committee*	
		Subtotal	%	Subtotal	%	Min. %	Max. %
1	Mathematics and Basic Sciences	12	21.43	36	21.43	18	22
2	Engineering Fundamentals	16	28.57	48	28.57	25	30
3	Computer Core and Electives	16	28.57	48	28.57	25	30
4	Graduation Project	2	3.57	6	3.57	4	6
5	Humanities	6	10.72	18	10.72	8	12
6	Business Management	2	3.57	6	3.57	2	4
7	Engineering culture	2	3.57	6	3.57	4	6
TOTAL		**56**	**100**	**168**	**100**		

***Supreme Council of Egyptian Universities, Egypt, 2016.**

No	Mathematics and Basic Sciences	Engineering Fundamentals	Computer Core and Electives	Graduation Project	Humanities	Business Management	Engineering culture
01	Calculus I.	Engineering Mechanics I	Microprocessor Systems.	Graduation Project (Part I)	Ethics, Safety and Health	Fundamental of Data Base Design	Engineering Drawing.
02	Calculus II.	Engineering Mechanics II	Algorithms and Data Structure.	Graduation Project (Part II)	Project Management Systems	Artificial Intelligence.	Workshop Technology.
03	Linear Algebra.	Chemistry	Digital System Interfacing.		Humanity Electives		
04	Differential Equations.	Electric Circuit Analysis I.	Operating Systems		Academic English Writing		
05	Mathematical Analysis and Numerical Methods.	Physics of Electrical Materials.	Concepts of Programming Languages.		Technical English Writing.		
06	Probability and Statistics.	Electric Circuit Analysis II.	Software Engineering.		Research English Writing.		
07	Engineering Physics I	Electrical Energy Conversion.	System Analysis and Design.				
08	Engineering Physics II.	Digital Logic Design I.	Computer Architecture.				
09	Introduction to Information Technology.	Digital Logic Design II.	Computer Security.				
10	Modern Physics	Electronic Circuits Analysis I.	Computer Networks				
11	Engineering Computer Programming I.	Data Communication.	Information Theory and Coding				
12	Engineering Computer Programming II	Digital System Interfacing.	Mobile Communication System				
13		Linear Systems.	VLSI Design.				
14		Electronic Circuits Analysis II.	Elective 2				
15		Automatic Control Systems.	Elective 3				
16		Digital Signal Processing	Elective 4				

2.4 University-Faculty-Department Requirements

The following tables represent the distribution of modules according to University, Faculty, and Department Requirements and their corresponding percentages. Also, the table shows the courses common with other departments such as ECE, ESE (Electrical Communications Systems department) and ISE (Industrial Systems Department).

University Requirements	Faculty Requirements	Department Requirements	
		General Specialization	Fine Specialization
ENG 156: Academic English Writing	MAT 151: Calculus I	ESE 253: Electric Circuits Analysis I	CSE 352: Microprocessor Systems
ENG 166: Technical English Writing	MAT 161: Calculus II	ECE 254: Digital Logic Design I	CSE 354: Algorithms and Data Structure
ENG 256: Research English Writing	MAT 251: Linear Algebra	ESE 262: Physics of Electrical Materials	CSE 364: Operating Systems
HUM 562: Ethics, Safety and Health	MAT 261: Differential Equations	ESE 263: Electric Circuits Analysis II	CSE 451:Concepts of Programming Languages
HUM 266: Project Management	MAT 351: Mathematical Analysis and Numerical Methods	ECE 264: Digital Logic Design II	CSE 452: Software Engineering
	MAT 361: Probability and Statistics	ECE 353: Electronic Circuits I	CSE 453x: CSE Elective I
	BSC 152: Engineering Physics I	ECE 355: Data Communication	CSE 463x: CSE Elective II
	BSC 162: Engineering Physics II	ECE 356: Electronic Measurements Instruments	CSE 454: Systems Analysis and Design
	BSC 164: Chemistry	ECE 365: Linear Systems	CSE 456: Computer Architectures
	COM 155: Int. to Information Technology	ECE 363: Electronic Circuits II	CSE 461: Computer Security
	COM 255: Eng. Computer Programming I	CSE366: Computer Networks	CSE 462: Fundamental of Data Base Design
	COM 265: Eng. Computer Programming II	ECE455: Automatic Control Systems	CSE 464: Artificial Intelligence
	GSE 153: Engineering Mechanics I	ECE 465: Information Theory and Coding	CSE 553x: CSE Elective III
	GSE 163: Engineering Mechanics II	ECE 466: Digital Signal Processing	CSE 563x: CSE Elective IV
	GSE 154n: Engineering Drawing	ESE 551: Energy Conversion	CSE 554: Graduation Project (Part I)
	GSE 165 Workshop Technology	ECE 552: Mobile Communication Systems	CSE 564: Graduation Project (Part II)
		BSC 252: Modern Physics	
		ECE 561: VLSI Design	
		CSE 362: Digital System Interfacing	

Type of Requirements	Courses		Reference set by Engineering Sector Committee (%)*
	number	%	
University Requirements	5	8.9	6 - 10
Faculty Requirements	16	28.6	22 - 30
Department General Specialization Requirements	19	33.9	30 - 35
Department Fine Specialization Requirements	16	28.6	20 - 30
Total	56	100	

***Supreme Council of Egyptian Universities, Egypt, 2016.**

CHAPTER III

PROGRAMME STUDY

MSA Faculty of Engineering aims at promoting students' capacity to approach problem- solving creativity, as well as increasing their understanding of technology impact on the society. This will help orient future engineers to lead successful professional careers worldwide. The Engineering programmes seek to ensure: (1) blending rigorous foundation in Mathematics, Basic Sciences, Engineering Fundamentals, and Systems Engineering in various disciplines; (2) effectively using computers in communication, computation and design; (3) understanding the uncertainties involved in engineering systems by utilizing probabilistic, statistical, and stochastic techniques; (4) working in broad multi-disciplinary team environment; (5) broadening students' horizons through the study of social sciences and humanities; and (6) exposing students to man/machine systems, which will result in quick advancement into management positions.

The CSE programme consists of 56 courses with 168 credit hours. These modules are distributed on the basis of 6 modules per semester during the first 4 years, and 4 modules per semester, including graduation project, in the fifth year.

The total number of contact hours during the five academic years is 250.5 hours. This is based on:

- 27.5 contact hrs./week during the semester number 1.
- 25 contact hrs./week during the semesters number 2,7,8.
- 27 contact hrs./week during the semester number 3.
- 26.5 contact hrs./week during the semesters number 4,5.
- 25.5 contact hrs./week during the semester number 6.
- 22 contact hrs./week during the semester number 9.
- 20.5 contact hrs./week during the semester number 10.

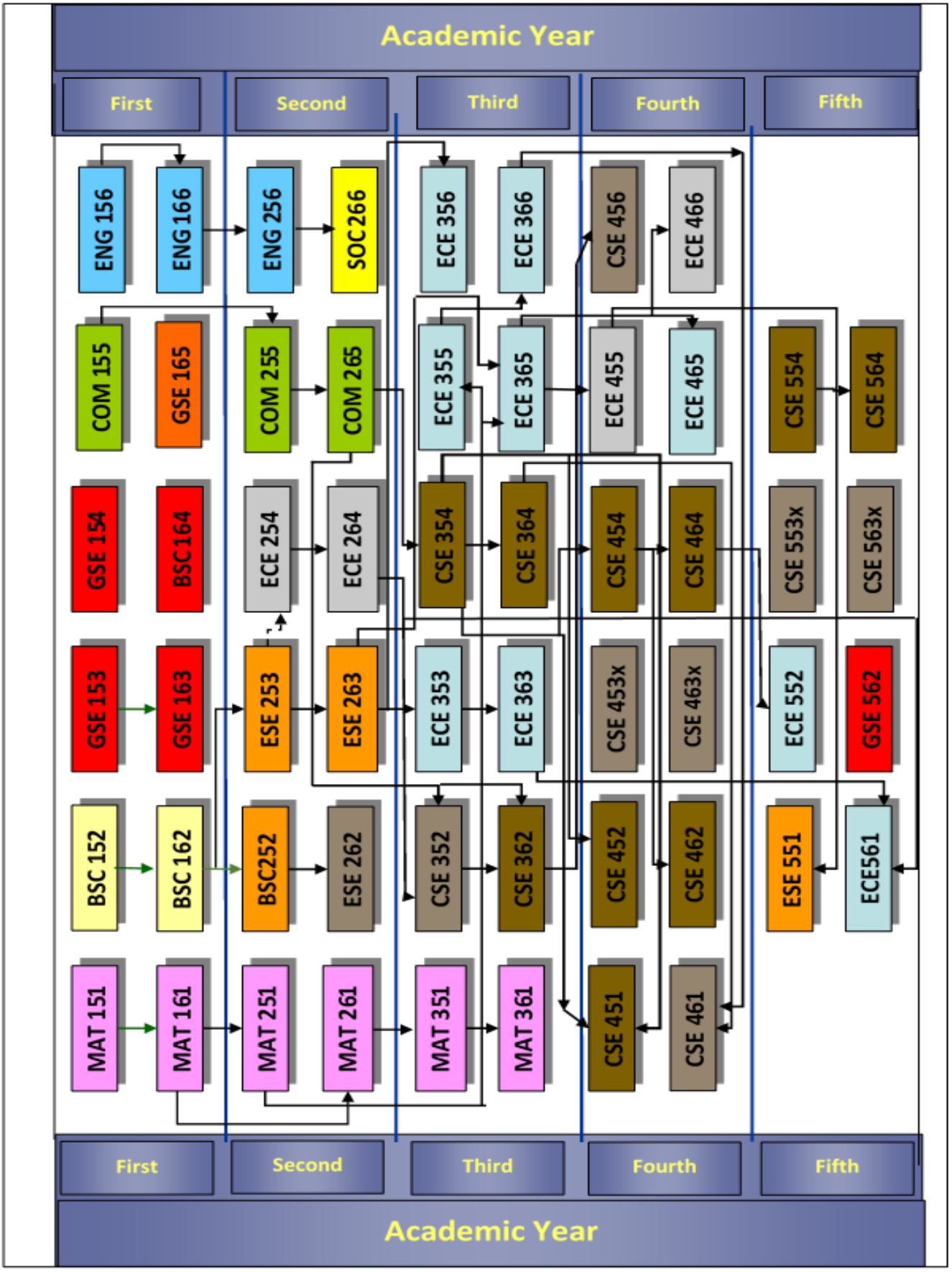
The analysis of these contact hours is displayed in the following table:

Contact Hours	Lecture	Tutorial	Laboratory	Total
Number of Contact Hours	120	29	101.5	250.5
Percentage of Contact Hours	47.9 %	11.6 %	40.5 %	100%

The CSE programme is displayed in a tree, showing the various modules at all five levels, and the relationships among them, taking into consideration the prerequisite modules. The programme is also displayed traditionally in 10-semester tables, showing the module title, the number of contact hours for lecturing, tutoring, and laboratory, if any.

3.1 CSE MODULE-PREREQUISITE TREE:

3.1 CSE MODULE-PREREQUISITE TREE:



3.2 CSE Ten-semester Curriculum

FIRST YEAR

FALL SEMESTER **Table (1)**

NO	Code	Course Title	Credit.	Lect.	Tutor.	Lab.
01	MAT 151	Calculus I	3	2.5	1	-
02	BSC 152	Engineering Physics I	3	2	-	3
03	GSE 153	Engineering Mechanics I	3	2.5	1	-
04	GSE 154n	Engineering Drawing	3	-	3	4.5
05	COM 155	Introduction to Information Technology	3	2	-	3
06	ENG 156	Academic English writing	3	3	-	-
			18	**12**	**5**	**10.5**
				27.5 hrs		

SPRING SEMESTER **Table (2)**

NO	Code	Course Title	Credit.	Lect.	Tutor.	Lab.
01	MAT 161	Calculus II	3	2.5	1	-
02	BSC 162	Engineering Physics II	3	2	-	3
03	GSE 163	Engineering Mechanics II	3	2.5	1	-
04	BSC 164	Chemistry	3	2	-	3
05	GSE 165	Workshop Technology	3	2	-	3
06	ENG 166	Technical English Writing	3	3	-	-
			18	**14**	**2**	**9**
				25 hrs		

SECOND YEAR

FALL SEMESTER **Table (3)**

NO	Code	Course Title	Credit.	Lect.	Tutor.	Lab.
01	MAT 251	Linear Algebra	3	2.5	1	-
02	BSC 252	Modern Physics	3	2	-	3
03	ESE 253	Electrical Circuits Analysis I	3	2.5	-	1.5
04	ECE254	Digital Logic Design I	3	2	1	1.5
05	COM 255	Computer Programming I	3	1	-	6
06	ENG 256	Research English Writing	3	3	-	-
			18	**13**	**2**	**12**
				27 hrs		

SPRING SEMESTER **Table (4)**

NO	Code	Course Title	Credit	Lect.	Tutor.	Lab.
01	MAT 261	Differential Equations	3	2.5	1	-
02	ESE 262	Physics of Electrical Materials	3	2	1	1.5
03	ESE 263	Electrical Circuits Analysis II	3	2.5	-	1.5
04	ECE 264	Digital Logic Design II	3	2	1	1.5
05	COM 265	Computer Programming II	3	1	-	6
06	HUM 266	Project Management System	3	3	-	-
			18	**13**	**3**	**10.5**
				26.5 hrs		

THIRD YEAR

FALL SEMESTER **Table (5)**

NO	Code	Course Title	Credit.	Lect.	Tutor.	Lab.
01	MAT 351	Mathematical Analysis and Numerical Methods	3	2.5	1	1
02	CSE 352	Microprocessor	3	2	1	1.5
03	ECE 353	Electronic Circuits Analysis I	3	2	-	3
04	CSE 354	Algorithms and Data Structure	3	2	-	3
05	ECE 355	Data Communication	3	2.5	1	-
06	ECE 356	Electrical Measurement Instruments	3	2.5	-	1.5
			18	**13.5**	**3**	**10**
				26.5 hrs		

SPRING SEMESTER **Table (6)**

NO	Code	Course Title	Credit	Lect.	Tutor.	Lab.
01	MAT 361	Probability and Statistics	3	2.5	1	_
02	CSE 362	Digital System Interface	3	2	1	1.5
03	ECE 363	Electronic Circuits Analysis II	3	2	-	3
04	CSE 364	Operating Systems	3	2	1	1.5
05	ECE 365	Linear Systems	3	2.5	1	-
06	CSE366	Computer Networks	3	2	1	1.5
			18	**13**	**5**	**7.5**
				25.5 hrs		

FOURTH YEAR

FALL SEMESTER **Table (7)**

NO	Code	Course Title	Credit.	Lect.	Tutor.	Lab.
01	CSE 451	Concepts of Programming Languages	3	2	-	3
02	CSE 452	Software Engineering	3	2	1	1.5
03	CSE 453x	CSE Elective I	3	2.5	-	1.5
04	CSE 454	System Analysis and Design	3	2.5	1	-
05	ECE 455	Automatic Control Systems	3	2	1	1.5
06	CSE 456	Computer Architecture	3	2.5	1	-
			18	**13.5**	**4**	**7.5**
				25 hrs		

SPRING SEMESTER **Table (8)**

NO	Code	Course Title	Credit	Lect.	Tutor.	Lab.
01	CSE 461	Computer Security	3	2	-	3
02	CSE 462a	Fundamental of Database Design	3	2.5	-	1.5
03	CSE 463x	CSE Elective II	3	2.5	-	1.5
04	CSE 464a	Artificial Intelligence	3	2.5	1	-
05	ECE 465	Information Theory and Coding	3	2.5	1	-
06	ECE 466	Digital Signal Processing	3	2	-	3
			18	**14**	**2**	**9**
				25 hrs		

FIFTH YEAR

FALL SEMESTER **Table (9)**

NO	Code	Course Title	Credit.	Lect.	Tutor.	Lab.
01	ESE 551	Electrical Energy Conversion	3	2	1	1.5
02	ECE 552	Mobile Communication Systems	3	2	1	1.5
03	CSE553x	CSE Elective III	3	2.5	-	1.5
04	CSE 554	Graduation Project (Part I)	3	-	-	9
			12	**6.5**	**2**	**13.5**
				22 hrs		

SPRING SEMESTER **Table (10)**

NO	Code	Course Title	Credit	Lect.	Tutor.	Lab.
01	ECE 561	VLSI	3	2	1	1.5
02	HUM562	Ethics, Safety and Health	3	3	-	-
03	CSE563x	CSE Elective IV	3	2.5	-	1.5
04	CSE 564	Graduation Project (Part II)	3	-	-	9
			12	**7.5**	**1**	**12**
				20.5 hrs		

CHAPTER IV

MODULE DISCRIPTION

Computer Systems Engineering students are introduced to a broad spectrum of Industrial Systems Engineering topics augmented by modern engineering experimentation, methodology, and practice.

Computer Systems Engineering graduates should be capable of adapting to the ever-evolving engineering tools and procedures in the practice of all aspects of life long industrial systems engineering profession. Graduates should be able to tackle unstructured engineering problems as teamwork to think critically, function perfectly, and communicate effectively.

The five-year plan is displayed in two tables, semester-wise. One table shows the ISE curriculum according to code, subject, credit, and prerequisite. The second table displays, the ISE and IE equivalent module codes. The module outlines are followed.

4.1 CSE Five-Year Plan

4.1 CSE Five-Year Plan:

56 Courses	Fall Semester	Spring Semester	168 Credits

	Code	Subject	Cr.	Prereq.
Year 1	MAT151	Calculus I	3	None
	BSC152	Engineering Physics I	3	None
	GSE153	Engineering Mechanics I	3	None
	GSE154n	Engineering Drawing	3	None
	COM155	Intr. to Information Technology	3	None
	ENG156	Academic English Writing	3	None

Code	Subject	Cr.	Prereq.	
MAT161	Calculus II	3	MAT151	
BSC162	Engineering Physics II	3	BSC152	
GSE163	Engineering Mechanics II	3	GSE153	Year 1
BSC164	Chemistry	3	None	
GSE165	Workshop Technology	3	None	
ENG166	Technical English Writing	3	ENG156	

	Code	Subject	Cr.	Prereq.
Year 2	MAT251	Linear Algebra	3	MAT161
	BSC252	Modern Physics	3	BSC162
	ESE253	Electric Circuit Analysis I	3	BSC162
	ECE254	Digital Logic Design I	3	Co -Req ESE253
	COM255	Computer Programming I	3	COM155
	ENG256	Research English Writing	3	ENG166

Code	Subject	Cr.	Prereq.	
MAT261	Differential Equations	3	MAT161	
ESE262	Physics of Electrical Materials	3	BSC252	
ESE263	Electric Circuit Analysis II	3	ESE253	Year 2
ECE264	Digital Logic Design II	3	ECE254	
COM265	Computer Programming II	3	COM255	
HUM 266	Project Management Systems	3	ENG256	

	Code	Subject	Cr.	Prereq.
Year 3	MAT351	Mathematical Analysis and Numerical Methods	3	MAT261
	CSE352	Microprocessor Systems	3	ECE264 + COM265
	ECE353	Electronic Circuits Analysis I	3	ESE263
	CSE354	Algorithms and Data Structure	3	COM265
	ECE355	Data Communication	3	MAT251
	ECE356	Electronic Measurement Instruments	3	ESE263

Code	Subject	Cr.	Prereq.	
MAT361	Probability and Statistics	3	MAT351	
CSE362	Digital System Interfacing	3	CSE352 + COM265	
ECE363	Electronic Circuits Analysis II	3	ECE 353	Year 3
CSE364	Operating Systems	3	CSE354	
ECE365	Linear Systems	3	ESE263+ MAT351	
CSE366	Computer Networks	3	ECE355	

	Code	Subject	Cr.	Prereq.
Year 4	CSE451	Concepts of Programming Languages	3	CSE354
	CSE452	Software Engineering	3	CSE354
	CSE453x	CSE Elective I	3	As per elective
	CSE454	System Analysis and Design	3	CSE354
	ECE455	Automatic Control Systems	3	ECE365
	CSE456	Computer Architecture	3	CSE362

Code	Subject	Cr.	Prereq.	
CSE461	Computer Security	3	CSE366 + CSE364	
CSE462a	Fundamentals of Database Design	3	CSE454	
CSE463x	CSE Elective II	3	As per elective	Year 4
CSE464a	Artificial Intelligence	3	CSE454	
ECE465	Information Theory and Coding	3	ECE365	
ECE466	Digital Signal Processing	3	ECE365	

	Code	Subject	Cr.	Prereq.
Year 5	ESE551	Electrical Energy Conversion	3	ECE455
	ECE552	Mobile Communication Systems	3	ECE464
	CSE553x	CSE Elective III	3	As per elective
	CSE554	Graduation Project (Part I)	3	Min 138 Cr.

Code	Subject	Cr.	Prereq.	
ECE561	VLSI	3	ECE264 + ECE363	
HUM562	Ethics, Safety and Health	3	5th year standing	
CSE563x	CSE Elective IV	3	As per elective	Year 5
CSE564	Graduation Project (Part II)	3	CSE554	

4.2 New CSE and Old CSE Equivalent Module Codes

4.2 CSE Equivalent Module Codes

All codes are the same Except:

- Changing code "GSE 562: Ethics, Safety and Health" into "HUM 562"
- Changing Course code "SOC 266: Projects Management" into "HUM 266"

4.3 CSE Module Outline:

Faculty of Engineering curricula are designed according to the most up-to-date international standards, taking in the consideration the Supreme Council of Universities (Engineering Studies Section Committee) requirements, and fulfill the local and regional needs.

All module outlines highlight the role of new and emerging technologies in meeting challenges posed by the information and communication technology.

Adopting the Greenwich University's Quality Assurance (QA) under the supervision of Britain's QA, the module outline includes: Aims, Syllabus, Learning Outcomes, Teaching/Learning Strategies, Learning Materials, Assessment Scheme, Assessment Pattern, Learning Unit Contact Hours, and Module Leader.

100's LEVEL MODULES
First Semester

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: MAT151**
Title	**: Calculus I**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: None**

AIMS

This module is designed to give freshman students an in depth coverage of functions, analysis of graphical information, limits continuity, derivative of functions, Inverse functions, transcendental functions, L'hopital rule, Analysis of functions, Functions of several variables, and partial derivative.

SYLLABUS

Topics
Functions-Properties of Functions – Composite Functions.
Limits – Computational Techniques of Limits.
Continuty – Limits and Continuty of Trigonometric Functions.
The Derivative – Techniques of Differentiation – Derivative of Trigonometric Functions – The Chain Rule – Implicit and parametric Differentiation.
Inverse Functions – Logarithmic and Exponential Functions – Inverse Trignometric Functions – Hyprbolic Functions – Inverse Hyperbolic Functions.
L'Hopital Rule – Indeterminate Forms.
Taylor and Maclurin series.
Functions of Two or More Variables – Partial Derivatives – Chain Rules.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this module, students will be able to:

A1- Quote knowledge and understanding of fundamentals and basic concepts of many topics in calculus.

A2- Recognize various mathematical techniques and methods used for solving different mathematical and engineering problems.

A3- Acquire knowledge of the functions of two or more variables, partial derivatives and expansion of some series.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Recite definitions and demonstrate intuitive understanding of limits, continuity of a function and derivatives.

B2- Find and interpret derivatives of functions; logarithmic, exponential, trigonometric, hyperbolic and its inverse.

B3- Recognize a process whereby methods of solving problems can be employed.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Conduct different methods and ideas of solving problems, in order to achieve effective methods of solution.
C2- Analyze and correlate between solutions based on applying different mathematical approaches and techniques of Calculus.
C3- Apply general and personal skills to analyze alternative solutions to mathematical problems and selecting the optimum one.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Plan and implement efficient and effective ideas for solving different problems.
D2- Manage and arrange the workload tasks and time effectively.
D3- Search internet for different problems, ideas and applications related to the taught topics.

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Software Requirements:

- MAPLE, DRIVE, MATHEMATICA, MATLAB.

Useful Websites:

- http://www.math.ucdavis.edu
- http://www.math.nmc.edu
- http://www.math.montana.edu
- http://www.ugrad.math.ubc.ca

Reference Text:

- Thomas, Calculus-Early Transcendentals, 11th ed., Pearson-Addition wesly, 2006, Ch. 1-4,7,14

Supplementary Readings:

- Anton, H., I. Bivens and S. Davis, Calculus: Early Transcendentals, John Wiley and Sons, 8th ed., 2005 Ch. 1-5,8,15.
- Salaas and Hille's, One and Several Variables, John Wiley Inc., 9th ed., 2003.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. Exam).

Assessment Pattern

• Class Participation/Assignment	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs/semester
• Total self study hours	52.5	hrs/semester
• Total study hours	105	hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: BSC 152**
Title	**: Engineering Physics I**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: None**

AIMS

This physics module is designed to give the student a broad understanding of the fundamentals of physics and their applications. The module is particularly useful for the preparation of future studies in engineering.

SYLLABUS

Topics
Units and Dimensions
Scalars and Vectors and their properties
Velocity and acceleration for motions in one and two dimensions
Application of Newton's Laws of motion in one dimension
Work, energy and power
Elastic properties of matter
Pressure in fluids
Fluid statics – Pascal's and Archimedes' principles
Fluid dynamics – Equation of continuity and Bernoulli's equation
Thermal expansion of solids and liquids
Heat and thermal energy – Heat and work
The first law of thermodynamics
Heat transfer

Laboratory Experiments:

- Determining the acceleration of gravity using a simple pendulum
- Determining the acceleration of gravity using the free fall method
- Determining the elastic constant of a spring
- Determining Young's modulus
- Determining the coefficient of viscosity for a liquid
- Determining the value of Joule's equivalent of heat
- Determining the specific heat of a solid

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this module, students will be able to:

A1- Recognize and understand the basic physical principles in order to correctly answer conceptual questions and use basic mathematical techniques for solving quantitative problems in *Physics.*

A2- Understand the basic knowledge of: Units and Dimensions, Vectors, Newton's Laws of motion in one dimension, Work, energy, and power, Elastic properties of matter, Pressure in fluids, Pascal's and Archimedes' principles, Equation of continuity and Bernoulli's equation, Thermal expansion of solids and liquids, Heat and thermal energy, The first law of thermodynamics, and Heat transfer.

A3- Collect and identify experimental data to extract valid conclusions, while making an appropriate safety assessment.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Investigate the relations and differences between different physical concepts of *Physics*.
B2- Identify and apply the laws of physics along with the necessary mathematics to successfully solve a variety of *Physics* problems.
B3- Apply ideas and techniques of *Physics* to resolve general classes of problems.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Solve problems by using the principle laws of *Physics*.
C2- Analyze and correlate between solutions based on applying different physical approaches and techniques of *Physics*.
C3- Apply general and personal skills to analyze alternative solutions to physical problems and selecting the optimum one.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Manage and arrange the workload tasks and time effectively.
D2- Establish initiative and leadership abilities.
D3- Communicate and share ideas ethically in any team work.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Projects

Learning Materials

Hardware Requirements:

- Mechanics, properties of matter, and thermal experiments in Physics I Lab.

Reference Texts:

- Douglas C. Giancoli, "*Physics for Scientists and Engineers with Modern Physics*", Pearson; 4th edition, 2009.
- Hafez A. Radi, *Laboratory Manual of Physics I*, MSA Univ., 2008.

Supplementary Readings:

- Hafez A. Radi and John O. Rasmussen, *Principles of Physics for Scientists and Engineers*, Springer-Verlag Berlin Heidelberg, 2013.
- Raymond A. Serway, John W. Jewett, "*Physics for Scientists and Engineers with Modern Physics*", Brooks Cole; 7th edition, 2007.

Assessment Scheme

- Project and Report.
- Quizzes.
- Weekly Assignments.
- Laboratory Final Test (1-hr. Test).
- Unseen Written Mid-Term Exam (1.5-hrs. Exam)
- Unseen Written Final-Exam (3 -hrs. Exam)

Assessment Pattern

Project and Report	5 %
Quizzes	9 %
Assignments	6 %
Class Participation and Portfolio	10 %
Laboratory Experiments and Final Lab Exam	10 %
Unseen Mid-Term Exam	20 %
Unseen Final Exam	40 %
Total	**100 %**

Learning Unit Contact Hours

- Lectures 2 hrs / week
- Laboratory 3 hrs / week
- Total class contact hours 75 hrs / semester
- Total self study hours 75 hrs / semester
- Total study hours 150 hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: GSE 153**
Title	**: Engineering Mechanics I**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: None**

AIMS

This module is designed to provide freshmen students with a perspective on Engineering Mechanics and Statics. Statics of particles. Forces and vectors. Rectangular components in a plane. Forces and vectors components in a space. Vectors addition. Scaler and vector products. Equilibrium of particle in a plane. Equilibrium of particle in a space. Rigid bodies. Equivalent system of forces, Moment of a force about a point and about a given axis in a rigid body and moment of a couple. Reduction of moments and couple into resultant of moments and wrench, equilibrium of rigid bodies for 2-D and 3-D structure. Center of gravity of 2-D and 3-D body. Centroids of areas and lines. Moment of inertia of areas and bodies.

SYLLABUS

Topics
Units and Forces.
Statics of Particles: Plane.
Statics of Particles: Space.
Statics of Rigid Bodies: Vector Product.
Statics of Rigid Bodies: Moments.
Moment – Couple and Wrench.
2-D Equilibrium Structure.
3-D Equilibrium Structure.
2-D Centroids and Center of Gravity.
3-D Centroids and Center of Gravity.
2-D Moment of Inertia.
3-D Moment of Inertia.
Real Case Studies.

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this module, students will be able to:

A1- Recognize and understand the basic principles of Statics in order to correctly answer conceptual questions and use basic mathematical techniques for solving quantitative problems in Statics.

A2- Understand the basic knowledge of: Forces and Vectors. Equilibrium of particle in a plane and in space, Rigid bodies, Equivalent system of forces, Moment of a force about a point and about a given axis in a rigid body and moment of a couple. Reduction of moments and couple into resultant of moments and wrench, equilibrium of rigid bodies for 2-D and 3-D structure. Center of gravity of 2-D and 3-D bodies. Centroids of areas and lines. Moment of inertia of areas and bodies.

A3- Collect, identify and present data to extract valid conclusions through making and presenting a project/paper.

B- Intellectual Skills

After completing this module, students will be able to:

B1- Investigate the relations and differences between different concepts of Statics.
B2- Identify and apply the laws of Statics along with the necessary mathematics to successfully solve a variety of Statics problems.
B3- Apply the theory of Statics to structure design.

C- Professional and Practical Skills

After completing this module, students will be able to:

C1- Solve problems by using the principle laws of Statics.
C2- Analyze and correlate between solutions based on applying different mechanical approaches and techniques.
C3- Apply general and personal skills to analyze alternative solutions to statical problems and selecting the optimum one.

D- General and Transferable Skills

After completing this module, students will be able to:

D1- Manage and arrange the workload tasks and time effectively.
D2- Establish initiative and leadership abilities.
D3- Communicate and share ideas ethically in any team work.

Teaching/Learning Strategies

- Lectures.
- Individual/Group Projects.
- Tutorials.
- Class Presentation.

Learning Materials

Useful Websites:

- http://www.statics.com
- http://www.ent.ohiou.edu
- http://www.amazon.com

Reference Text:

- Hibbeler, R. C., Engineering Mechanics (Statics and Dynamics), Macmillan, 11th ed., 2006.

Supplementary Readings:

- Irving Shames, Engineering Mechanics (Statics and Dynamics), Prentice Hall, 4th ed., 1996.
- Beer, F. P., Jhonston, E., Jr. and Eisenberg, E.R., Vector Mechanics for Engineers, McGraw-Hill, 1996
- Meriam, J. L. and Kraige, L. G., Engineering Mechanics (Statics and Dynamics), John Wiley Inc., 5th ed., 2002.

Assessment Scheme

- Weekly written Assignments.
- Short written Quizzes.
- Class written Tests.
- Individual/Group Project.
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. Exam).

Assessment Pattern

- Class Participation 10 %
- Assignments 10 %

• Tests and Quizzes	15 %
• Term Paper	5 %
• Unseen Mid-term Exam	20 %
• Unseen Final Exam	40 %
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs/semester
• Total self study hours	52.5	hrs/semester
• Total study hours	105	hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: GSE 154n**
Title	**: Engineering Drawing**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: None**

AIMS

This module is designed to provide freshmen students with an overview of engineering drawing. It deals with the graphic language development of design ideas into sketches. Drawing tools required in professional practice. Lettering styles. Definitions of terms and geometric construction in technical drawings. Methods of viewing an object to get its necessary dimensions. Showing complicated interiors of objects (Sectioning). Preparing drawings for the presentation of a design idea (Pictorial Isometric Drawing). Introduction to mechanical assembly principles:Standards of fasteners (threaded bolts and nuts, pins, gears, bearings, keys); Standards of fits and tolerances; Standards of surface finish and geometrical tolerances. Use of AutoCAD.

SYLLABUS

Topics
Graphic Language and Manual Drafting Instruments Used in Drawings.
Sheet Sizes, Drawing Scale, Lettering, Line Conventions and Dimensioning.
Geometric Construction
Orthographic Projection on One, Two, Three Planes.
Projection of a third view, and Drawing Isometric View from Given Two Views.
Sectional Views (Full, Half, Offset, Aligned, Partial, Moved and Revolved).
Dimensioning, Fits, Allowances,Geometric Tolerances, and Surface Roughness.
Threaded Fasteners (Bolts and Nuts, Washers, …..)
Miscellaneous Types of Fasteners (Keys, Pins, Retaining Rings,…..).
Working Drawing, and Assembly Drawing.
Principles of Drawing Gears and Bearings in Assembly.

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this module, students will be able to:

A1- Understand the fundamentals of engineering drawing.
A2- Understand various types of engineering component connections.
A3- Learn to take data and transform it into graphic drawings.
A4- Learn basic engineering drawing formats and Software.

B- Intellectual Skills

After completing this module, students will be able to:

B1- Use the medium of drawings in engineering communications and emonstrate skills in interpreting, and producing engineering drawings accurately and efficiently.
B2- Demonstrate skills in computer-aided-drafting to produce detailed 2D drawings.
B3- Identify detail parts of an assembly, then draw the assembled parts and make the required sections in the assembly.

B4- Choose the type of fit between the mating parts, and calculate the allowances and tolerances for the assembled parts as needed.

C- Professional and Practical Skills

After completing this module, students will be able to:

C1- Sketch two-dimensional orthographic drawings and three-dimensional isometric views.
C2- Create and modify two-dimensional orthographic drawings using AutoCAD software, complete with construction lines, dimensions, conforming to industry standards.

D- General and Transferable Skills

After completing this module, students will be able to:

D1- Communicate with people through the language of technical drawing and sketching.
D2- Read and interpret engineering drawings created by others.

Teaching/Learning Strategies

- Design studio.
- Auto CAD Lab.

Learning Materials

Hardware Requirements:

- Various manual drawing tools.
- PC and Datashow Projector.
- Computer Lab, Printers.

Software Materials

- Auto CAD 2010 Program.

Useful Websites:

- http://www.ces.clemson.edu
- http://www.osu.okmulgee.edu
- http://www.ces.celemson.edu
- http://www.mhhe.com
- http://www.osu-okumulgee.edu
- http://www.ces.clemson.edu

Reference Text:

- MSA Staff, Engineering Drawing, 2009.

Supplementary Readings:

- Thomas, E. F., Fundamentals of Engineering Drawing, McGraw Hill Co., 1998.
- Hart, K. R., Engineering Drawing, English Universities Press Ltd., 1999.
- Thomas, E. F. and Vierck, C. J., Engineering Drawing and graphic Technology, McGraw Hill Co., 2001.
- Fredrick E. Giesecke et. Al., Engineering Graphics., MACMILLAN Co., 5th ed., 1993.
- David A. Madsen, Engineering Drawing and Design THOMSON Delmar Learning,4th ed., 2007.

Assessment Scheme

- Weekly Assignments.
- Class Tests.
- Unseen Mid-Term Exam (2-hr. Exam).
- Unseen Final-Exam (4-hr. Exam).

Assessment Pattern

• Studio Participation	10 %
• Lab participation	10 %
• Assignments (Studio and Lab)	10%
• Tests and Quizzes	10%
• Unseen Mid-Term Exam (Manual + Auto CAD)	20%
• Unseen Final Exam (Manual + Auto CAD)	40%
Total	**100%**

Learning Unit Contact Hours

• Studio and Tutorial	3 hrs / week
• Laboratory	4.5 hrs / week
• Total studio and Lab contact hours	112.5 hrs/semester
• Total self work hours	112.5 hrs/semester
• Total work hours	225 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: COM 155**
Title	**: Introduction to Information Technology**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: None**

AIMS

This module is designed to familiarize freshmen students with efficient use of computers, devices and applications. The lecture part of this course serves as an introduction to computer-related terminology and concepts, and as an investigation of the internal components of a computer system (motherboard, microprocessor, primary storage, buses, ports and add-on boards, secondary storage devices, output devices). Introduction to Computer graphics and Computer networks are to be introduced as well. In addition, the course introduces common software concepts, operating systems and programming languages. The AUTOCAD and MATLAB packages are to be introduced as well. The tutorial part of this course should improve keyboarding skills. It introduces the microcomputer platform with emphasis on windows environment, the use of Internet: navigation and search capabilities. Training on popular computer application packages, mainly, Microsoft Office (including word processor, spreadsheet, presentation, graphics and databases), Working with the internet, AUTOCAD and MATLAB.

SYLLABUS

Topics
Computers: Introduction
The Central Processing Unit and numbering systems
Input and Output
Introduction to MATLAB and functions representation
Programming and Languages: Flow charting (problem solving and algorithms introduction)
Storage Devices
The Internet and searching net
Networks
Introduction to AUTOCAD and graphics designing programs

Intended Learning Outcomes (ILOs)

A. Knowledge and Understanding Skills.

After completing this module, students will be able to:

A1- Recognize how to use Windows platform, troubleshoot common errors, and how to use standard spread sheets.
A2- Recognize how to use presentations and graphical tools.
A3- Understand how to search the internet effectively.
A4- Understand how to improve keyboarding/word-processing skills.

B. Intellectual Skills.

After completing this module, students will be able to:

B1- Explore the internet and search for a specific subject.
B2- Present current ethical and social issues associated with computing.
B3- Distinguish between several different types of programming languages and visual programming.
B4- Distinguish between different platforms.

C. Professional and Practical Skills.

After completing this module, students will be able to:

C1- Apply AUTOCAD and MATLAB Programs.
C2- Apply general and personal skills to form a comprehensive power point presentation.
C3- Analyze and Plan to search the internet effectively.
C4- Apply keyboarding/word-processing skills to use various word-processing applications.
C5- Analyze a computer system, and describe the processor.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Develop presentation skills.
D2- Develop Information Literacy.
D3- Develop Communication Skills.
D4- Develop Research and Evaluation skills.

Teaching/Learning Strategies

- Lectures.
- Computer Laboratories.
- Class Presentation.

Learning Materials

Software Requirements:

- MATLAB
- AUTOCAD
- MS-Office
- Internet Explorer

Useful Websites:

- http://www.prenhall.com/~longlong
- http://www.gpc.edu/
- http://www.it4all.co.uk/ (ICDL Course)
- http://www.howstuffworks.com/ (How stuff works)
- http://www.caam.rice.edu/~timwar/MA375F03/MA375.html

Reference Text:

- Capron, H. L. and J. A. Johnson, Computers: Tools for an Information Age, Prentice Hall, 8th ed., 2003.

Supplementary Readings:

- Long, L. and N. Long, Computers, Prentice Hall, 10th ed., 2002.
- Meyer, M., Explorations in Computer Science: A Guide to Discovery. Jones and Bartlett Pub, 2003.
- Cashman, T. J. and G. B. Shelly, Essential Introduction to Computers, 5th ed. Course Technology, 2003.
- Dale, N. and J. Lewis, Computer Science Illuminated, Jones and Bartlett Pub, 2002.
- Turban, E., R. K. Rainer Jr., R. E. Potter, Introduction to Information Technology, John Wiley and Sons, 2nd ed., 2002.

Assessment Scheme

- Weekly computer Assignments.
- Quizzes.
- Computer Lab and Mini projects.
- Unseen computer Mid-Term Exam (1.5-hr. Exam).
- Unseen computer Final-Exam (3-hr. Exam).

Assessment Pattern

• Class participation	10%
• Assignments and Quizzes	10%
• Lab work and Projects	20%
• Unseen Midterm Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2 hrs / week
• Computer Laboratory	3 hrs / week
• Total class contact hours	75 hrs/semester
• Total self study hours	75 hrs/semester
• Total study hours	150 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ENG 156**
Title	**: Academic English Writing**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: None**

AIMS

This module is designed to help freshmen students in effectively writing academic essays and avoiding common errors, teach students how to read comprehension passages, to learn style and organization patterns to do summary writing and understand vocabulary in context and to introduce specialized vocabulary items pertaining to Engineering Sciences.

SYLLABUS

Topics
Writing: the Essay • Introduction of writing correction code • From Grammar to Writing: The Sentence
Reading: "Unit I" • Writing: Describing a Person • From Grammar to Writing: Subject/Verb agreement
Reading: "Unit II" • Writing: Describing a Place • From Grammar to Writing: Editing exercises
Reading: "Unit III" • Writing: Describing an Event • From Grammar to Writing: Parallelism
Reading: "Unit IV" • Writing: Describing a Process • From Grammar to Writing: Editing exercises
Reading: "Unit V" • Writing: Distinguishing facts from opinions • Specialized Vocabulary
Wring: Directed Free Writing/Editing • From: Grammar to Writing: Parallelism of Gerunds and Infinitives • Specialized Vocabulary
Reading "Unit VI" • Writing: Process Writing • From Grammar to Writing: Sentences and Fragments
Reading: "Unit VII" • Writing: Process Writing • From Grammar to Writing: Editing exercises
Reading: "Unit VIII" • Writing: Expository Writing (Comparison and Contrast) • From Grammar to Writing: Punctuation of Adjective Clauses
Reading: "Unit VIX" • Writing: Expository Writing (Definition and Partition) • From Grammar to Writing: Editing exercises
Reading: "Unit X" • Writing: Expository Writing (Classification) • From Grammar to Writing: Avoiding run-on sentences and comma splices
Reading: "Unit XI" • Writing: Practice – Summary Writing • From Grammar to Writing: Editing exercises

Intended Learning Outcomes (ILOs)

A- Knowledge and Understanding Skills.

After completing this module, students will be able to:

A1- Understand how an academic essay is organized, and how to write a thesis statement.
A2- Recognize complex sentence structures and appropriate punctuation.
A3- Identify main and supporting ideas.
A4- Understand how to summarize and paraphrase a given text, and how to edit a piece of writing.

B- Intellectual Skills.

After completing this module, students will be able to:

B1- Identify and apply the Master specialized vocabulary pertaining to Engineering sciences.
B2- Apply Master writing effective summaries focusing on main ideas.
B3- Apply multi-draft writing which involves revision and editing of essays.

C- Professional and Practical Skills.

After completing this module, students will be able to:

C1- Analyze and Write an organized five paragraph academic essay.
C2- Apply general and personal skills to produce a thesis statement in any academic writing essay as relevant, and to Produce a variety of sentence structures to upgrade writing style using appropriate punctuation.
C3- Analyze and Plan the essay/ write an outline using main and supporting ideas.
C4- Apply general and personal skills to Write a summary/ paraphrase of a given text, and to Self-edit own essay.

D- General and Transferable Skills

After completing this module, students will be able to:

D1- Develop Creativity and Critical Thinking.
D2- Develop Information Literacy.
D3- Develop Communication Skills.
D4- Communicate and share ideas ethically in a team work.

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Useful Websites

- http://www. www.io.com
- http://www.better.english.com
- http:// www.eslcafe.com

Reference Text

- Alice Oshima, Ann Hogue, Writing Academic English, 1998, Addison Wesley.

Supplementary Readings

- Swales, JohnFeak, Christine B.Swales, John M, English in Today's Research World: A Writing Guide, 2001, Michigan Press.

Assessment Scheme

- Weekly assignment.
- Individual term project.
- Unseen Mid-Term Exam (1.5 Hrs exam).
- Unseen Final-Exam (3 Hrs exam).
-

Assessment Pattern

- Class participation 10%
- Assignments 10%
- Quizzes 10%
- Term Papers 10%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

Total 100%

Learning Unit Contact Hours

• Lectures	3	hrs / week
• Total class contact hours	45	hrs / semester
• Total self study hours	45	hrs / semester
• Total study hours	90	hrs / semester

Module Leader

Staff

100’s LEVEL MODULES
Second Semester

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: MAT161**
Title	**: Calculus II**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: MAT151**

AIMS

This module is designed to enable freshman students to analyze integration, applications of definite integrals, double and triple integrals, polar, cylindrical and spherical coordinates, infinite series, Taylor and Maclurin series.

SYLLABUS

Topics
Antiderivatives- The Indefinite Integrals – Integration by Substitution.
Techniques of integration- Basic Integration formulas- Integration by parts- Reduction formulas- Integration using partial fractions- Trigonometric Integrals- Trigonometric Substitution.
The Definite Integral – Fundamental Theorem of Calculus – Evaluation Definite Integrals by Substitution.
Applications of Definite Integrals (Area – Volume – Arc Length – Surface of Revolution).
Integration Methods – Integration by Parts – Trigonometric Integrals – Trigonometric Substitutions – Integration Using Partial Fraction.
Double Integrals – Double Integrals in Polar Coordinates – Areas.
Triple Integrals – Triple Integrals in Cylindrical and Spherical Coordinates – Volumes.
Infinite Series – Convergence Tests.

LEARNING OUTCOMES

A. Knowledge and Understanding Skills

After completing this module, students will be able to:

A1- Quote knowledge and understanding of fundamentals and basics of indefinite, definite integrals, double, triple integrals and their applications.

A2- Recognize various mathematical techniques and different methods of integration for solving mathematical and engineering problems.

A3- Acquire knowledge of power series including different tests for convergence.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Recite definitions and demonstrate intuitive understanding of Antiderivatives and indefinite integration.

B2- Recognize and apply methods of integration to solve indefinite integrals, evaluate definite integrals and solve application problems.

B3- Determine convergence and divergence of infinite series using different tests of convergence.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Conduct different methods and ideas of solving problems, in order to achieve effective methods of solution.
C2- Analyze and correlate between solutions based on applying different mathematical methods and techniques of *integration*.
C3- Apply general and personal skills to analyze alternative solutions to mathematical problems and selecting the optimum one.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Plan and implement efficient and effective ideas for solving different problems.
D2- Manage and arrange the workload tasks and time effectively.
D3- Search internet for different problems, applications and ideas related to the taught topics.

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Software Requirements:

- MAPLE, DRIVE, MATHEMATICA, MATLAB.

Useful Websites:

- http://www.omega.albany.edu
- http://www.math.nmc.edu
- http://www.math.montana.edu
- http://www.ugrad.math.ubc.ca

Reference Text:

- Thomas, Calculus- Early Transcendentals, 11th ed., Pearson- Addition wesly, 2006, Ch. 4-6,8,16

Supplementary Readings:

- Kreysing, E., Advanced Engineering Mathematics, John Wiley Publishing Co., New eddition.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. Exam).

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs/semester
• Total self study hours	52.5	hrs/semester
• Total study hours	105	hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: BSC 162**
Title	**: Engineering Physics II**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: BSC 152**

AIMS

This module is designed to enable students to demonstrate the basic concepts and principles of sound waves, light waves, electricity and magnetism, and their applications in the real world. It deals with electric circuits and solving circuits using Kirchhoff's rules. The module also encourages students to perform practical projects in various aspects of physics.

SYLLABUS

Topics
Oscillations and Sound waves
Electric charge
Coulomb's law
Electric fields
Gauss's law and its applications
Electric potential energy and electric potential
Capacitors and dielectrics
Electric currents and DC circuits
Magnetic fields
Sources of the magnetic field - Magnetic materials
Faraday's law
Magnetic induction
Light waves and optics

Laboratory Experiments:

- Determination of the Dielectric constant.
- Determination of the time constant.
- Determination of an unknown resistance.
- Determination of the total resistance of a series DC circuit
- Determination of the fill factor of a photovoltaic cell.
- Determination of the horizontal component of the earth's magnetic field.
- Determination of the velocity of sound.
- The Hall Effect.

LEARNING OUTCOMES

A. Knowledge and Understanding Skills

After completing this module, students will be able to:

A1- Recognize and understand the basic physical principles in order to correctly answer conceptual questions and use basic mathematical techniques for solving quantitative problems in *Physics.*

A2- Understand the basic knowledge of: Oscillations and Sound waves, Electric charge, Coulomb's law, Electric fields, Gauss's law and its applications, Electric potential energy and electric potential, Capacitors and dielectrics, Electric currents and DC circuits, Magnetic fields, Sources of the magnetic field - Magnetic materials, Faraday's law, Magnetic induction, and Light waves and optics.

A3- Collect and identify experimental data to extract valid conclusions, while making an appropriate safety assessment.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Investigate the relations and differences between different physical concepts of *Physics*.

B2- Identify and apply the laws of physics along with the necessary mathematics to successfully solve a variety of *Physics* problems.

B3- Apply ideas and techniques of *Physics* to resolve general classes of problems.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Solve problems by using the principle laws of *Physics*.

C2- Analyze and correlate between solutions based on applying different physical approaches and techniques of *Physics*.

C3- Apply general and personal skills to analyze alternative solutions to physical problems and selecting the optimum one.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Manage and arrange the workload tasks and time effectively.

D2- Establish an initiative and leadership abilities.

D3- Communicate and share ideas ethically in any team work.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Projects

Learning Materials

Hardware Requirements:

- Electrical and Magnetic Experiments are performed in Physics II Lab.

Reference Texts:

- Douglas C. Giancoli, "*Physics for Scientists and Engineers with Modern Physics*", Pearson; 4th edition, 2009.
- Nabila Nowaira, *Laboratory Manual of Physics II*, MSA Univ., 2008.

Supplementary Readings:

- Hafez A. Radi and John O. Rasmussen, *Principles of Physics for Scientists and Engineers*, Springer-Verlag Berlin Heidelberg, 2013.
- Raymond A. Serway, John W. Jewett, "*Physics for Scientists and Engineers with Modern Physics*", Brooks Cole; 7th edition, 2007.

Assessment Scheme

- Project and Report.
- Class Quizzes.

- Online Quizzes.
- Weekly Assignments.
- Laboratory Final Test (1-hr. Test)
- Unseen Written Mid-Term Exam (1.5-hrs. Exam)
- Unseen Written Final-Exam (3 -hrs. Exam)

Assessment Pattern

Project and Report	5 %
Quizzes	5 %
Online Quizzes	4 %
Assignments	6 %
Class Participation and Portfolio	10 %
Laboratory Experiments and Final Lab Exam	10 %
Unseen Mid-Term Exam	20 %
Unseen Final Exam	40 %
Total	**100 %**

Learning Unit Contact Hours

• Lectures	2	hrs / week
• Laboratory	3	hrs / week
• Total class contact hours	75	hrs / semester
• Total self study hours	75	hrs / semester
• Total study hours	150	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: GSE 163**
Title	**: Engineering Mechanics II**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: GSE 153**

AIMS

This module is designed to provide students with a perspective on various issues of engineering mechanics and dynamics, kinematics of particles. rectilinear and curvilinear motion, kinetics of particles, linear and angular motion, energy and momentum of particles, kinematics of rigid bodies in translation and curvilinear motion. Forces and accelerations of plane motion for rigid bodies – energy and momentum of rigid bodies. Mechanical vibration.

SYLLABUS

Topics
Kinematics: Rectilinear Motion of Particle.
Erratic Motion.
Curvilinear Motion of Particle: Cartesian Coordinates.
Motion of Projectiles.
Curvilinear Motion of Particle: Normal and Tangential Coordinates.
Curvilinear Motion of Particle Polar Coordinates.
Kinetics of Particle: Force and Acceleration.
Mechanical Vibration.
Kinetics of Particles: Work and Energy.
Circular Motion.
Impulse and Momentum.
Real Case Studies.

LEARNING OUTCOMES

A. Knowledge and Understanding Skills

After completing this module, students will be able to:

A1- Recognize and understand the basic principles of Mechanics and Dynamics in order to correctly answer conceptual questions and use basic mathematical techniques for solving quantitative problems in Dynamics.

A2- Understand the basic knowledge of: kinematics of particles. rectilinear and curvilinear motion, kinetics of particles, linear and angular motion, energy and momentum of particles, kinematics of rigid bodies in translation and curvilinear motion. Forces and accelerations of plane motion for rigid bodies – energy and momentum of rigid bodies. Mechanical vibration.

A3- Collect, identify and present data to extract valid conclusions through making and presenting a project/paper.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Investigate the relations and differences between different concepts of Dynamics.
B2- Identify and apply the laws of Dynamics along with the necessary mathematics to successfully solve variety of Dynamics problems.
B3- Develop the motion design of mechanisms.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Solve engineering mechanics and dynamic problems by using the equation of motion of a dynamic system.
C2- Analyze and correlate between solutions based on applying different mechanical approaches and techniques.
C3- Apply general and personal skills to analyze alternative solutions to dynamic problems and selecting the optimum one.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Manage and arrange the workload tasks and time effectively.
D2- Establish initiative and leadership abilities.
D3- Communicate and share ideas ethically in any team work.

Teaching/Learning Strategies

- Lectures.
- Individual/Group Projects.
- Tutorials.
- Class Presentation.

Learning Materials

Useful Websites:

- http://www.xav.com
- http://www.eidosinteractive.com
- http://www.mdyn.com
- http://www.ams.org

Reference Text:

- Hibbeler, R. C., Engineering Mechanics (Statics and Dynamics), Macmillan Co., 11th ed., 2006.

Supplementary Readings:

- Irving Shames, Engineering Mechanics (Statics and Dynamics), Prentice Hall Inc., 4th ed., 1996.
- Beer, F.P and E. Jhonston, Jr. and E.R. Eisenberg, Vector Mechanics for Engineers, McGraw-Hill, 1996.
- Meriam, J. L. and Kraige, L. G., Engineering Mechanics (Statics and Dynamics), John Wiley Inc., 5th ed., 2002.

Assessment Scheme

- Weekly written Assignments.
- Short written Quizzes.
- Class written Tests.
- Individual/Group Projects.
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. Exam).

Assessment Pattern

• Class participation	10 %
• Assignments	10 %
• Tests and Quizzes	15 %
• Term Paper	5 %
• Unseen Mid-term Exam	20 %
• Unseen Final Exam	40 %
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5 hrs / week
• Tutorials	1 hrs / week
• Total class contact hours	52.5 hrs/semester
• Total self study hours	52.5 hrs/semester
• Total study hours	105 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: BSC 164**
Title	**: Chemistry**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**:**

AIMS

This Chemistry **module** is designed to give the student a broad understanding of the fundamentals of different Chemistry and their applications and also fundamentals of environmental problems such as water and air pollution and their treatment. The module is particularly useful for the preparation of **future** studies **in** all **engineering branches**.

SYLLABUS

Topics
Air Pollution
Water Pollution
Water Treatment
Fuel and Combustion
Properties of gasses
Thermochemistry
Chemical Thermodynamics
Electrochemistry
Chemical properties of solutions
Polymer Chemistry
Petroleum Chemistry
Cement Chemistry
Ceramics Industry
Glass Industry

Laboratory Experiments:

- Determination of unknown concentration solution using Acid – Base titration
- Determination of Alkalinity of water.
- Determination of Hardness of water.
- Determination of heat of hydration of cement
- Determination of viscosity for a liquid
- Determining the specific heat of a solid

LEARNING OUTCOMES

A. <u>Knowledge and Understanding Skills</u>

After completing this module, students will be able to:

A1- Recognize and understand the basic Environmental pollution problems (Air and Water) and their treatments.

A2- Define the basis of Thermo-chemistry Thermodynamics, Electrochemistry and Corrosion of Metals.

A3- Define the Chemistry of Polymers, cement, ceramics and glass industries and Fuel Combustion.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Establish a scientific base for the students in the field of Engineering Chemistry and solve industrial problems in a scientific method.
B2- Provide the student with knowledge about the effect of the environment on the different materials.
B3- Study the construction materials such as cement, ceramics and glass industries.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Apply knowledge of chemistry with the different engineering fields.
C2- Fix the knowledge of Chemistry to solve engineering problems.
C3- Apply general and personal skills to analyze alternative solutions to Chemical problems and selecting the optimum one.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Work effectively in a team.
D2- Develop the skills which are related to creative thinking, problem solveing, and teamwork in different fields.
D3- Manage and arrange the workload tasks and time effectively.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Projects

Learning Materials

Hardware Requirements:

Reference Texts:

- Dara S.S. and Umare S.S., "A textbook of Engineering Chemistry".
- *Chemistry Laboratory Manual*, MSA Univ.

Supplementary Readings:

- Raymond Chang, "Chemistry ", 10th Edition, 2010, McGraw-Hill Companies, Inc.

Assessment Scheme

- Project and Report
- Quizzes
- Weekly Assignments
- Laboratory Final Test (1-hr. Test)
- Unseen Written Mid-Term Exam (1.5-hrs. Exam)
- Unseen Written Final-Exam (3 -hrs. Exam)

Assessment Pattern

- Project and Report 3 %

• Quizzes	10 %
• Assignments	7 %
• Class Participation and Portfolio	10 %
• Laboratory Experiments and Final Lab Exam	10 %
• Unseen Mid-Term Exam	20 %
• Unseen Final Exam	40 %
Total	**100 %**

Learning Unit Contact Hours

• Lectures	2	hrs / week
• Laboratory	3	hrs / week
• Total class contact hours	75	hrs / semester
• Total self-study hours	75	hrs / semester
• Total study hours	150	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: GSE 165**
Title	**: Workshop Technology**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: None**

AIMS

This module is designed to provide freshmen students with an understanding of the traditional machine tools used in forming and machining processes: Turning, milling, grinding, drilling, boring, shaping, planning, shearing, bending, and rolling machines, as well as welding and casting equipment, wood working, and polymeric machines. An extensive coverage of health and safety into workshop practice, focussing on hazards control, safety precautions, and industrial hygiene, to develop a responsible awareness of hazards.

SYLLABUS

Topics
Health and Safety at work, Workshop Accidents. Electrical Hazards. Fire Protections
Hand Processes. Marking-out Equipment.
Workshop Measuring Equipment.
Turning machines and their elements, and cutting tools.
Milling machines and their elements, and cutters.
Grinding machines and their elements, and grinding wheels.
Drilling and Boring machines and their elements, and cutting tools.
Shaping and Planning machines and their elements, and cutting tools.
Shearing, Bending and Rolling machines.
Welding Equipment and related tools, and Electrical Connections.
Foundary Furnaces and Casting Equipment.
Wood working machines and related tools.
Pressing, Blowing, and Extrusion of polymeric machines.

LEARNING OUTCOMES

A. Knowledge and Understanding Skills

After completing this module, students will be able to:

A1- Understand the differences between the various types of machine tools used in machining and forming processes.
A2- Acquire knowledge of the various types of hand tools and measuring equipment.
A3- Become familiar with industrial health hazards and hygiene, as well as the means of safety precautions.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Analyse the relationship between materials and cutting tools.

B2- Analyse the relationship between materials and processes.
B3- Analyse the relationship between tolerances and processes.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Apply skills in running the various machines in the workshop.
C2- Select tools and design procedures for the production of a particular workpiece.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Communicate with people through the technical language of the workshop.
D2- Communicate and share ideas ethically in a team work.
D3- Manipulate, sort and present the information in a variety of ways.

Teaching/Learning Strategies

- Lectures.
- Workshops.
- Tutorials.
- Factory Visits.

Learning Materials

Hardware Requirements:

- Various machine tools in the University workshops.
- Manufacutring Processes Video Tapes.

Useful Websites

- http://www.xtend.co.nz
- http:/www.infopeople.org

Reference Text:

- Bruce J. Black, Workshop Processes, Practices, and Materials, published by Elsevier Ltd., 3rd ed., 2004, reprinted 2008.

Supplementary Readings:

- El Wakil, S. D., Processes and Design for Manufacturing, PWS Publishing Company, 2nd ed., 2002.
- Kalpakjian, S., Manufacturing Engineering and Technology, Addison Wesley Publishing Co., 1992.
- Walker, J. R., Machining Fundamentals, The Goodheart Willcos Co., 1993.
- Krar, S.F., Technology of Machine Tools, McGraw Hill Co., 1996.
- Groover, M. P., Fundamentals of Modern Manufacturing, Prentice Hall Co., 1996.
- DeGarmo, E. Paul, I.T. Black and R.A. Kosher, Materials and Processes in Manufacturing, Prentice Hall Inc., 8th ed., 1997.

Assessment Scheme

- Weekly written Assignments.
- Short written Quizzes.
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Oral Practical Exam (at the end of the semester)
- Unseen written Final-Exam (3-hr. Exam).

Assessment Pattern

- Class and Workshop Participation 10%

• Assignments (Team Reports)	10%
• Tests and Quizzes	15%
• Individual Oral Practical Test	5%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2	hrs / week
• Workshops and Labs	3	hrs / week
• Total class contact hours	75	hrs/semester
• Total self study hours	75	hrs/semester
• Total study hours	150	hrs/semester

Module Leader

Staff

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ENG 166**
Title	**: Technical English Writing**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: ENG 156**

AIMS

This module is designed to improve students formal reports and business proposals writing, note taking and oral presentation skills. Help students to acquire study skills that would facilitate any research process. Teach students types of business writing, such as reports, business letters, memos, and curriculum vitae. There is also a focus on reading and listening skills and learning vocabulary in context.

SYLLABUS

Topics
Using Grammatical Information in Paraphrasing : Reading: Unit 1 – Chapter 2
Paraphrasing : Reading Unit 1 – Chapter 2
Organization Analysis : Reading: Unit 2 – Chapter
Organization Analysis + Outline : Reading: Unit 2 – Chapter 3
Questionnaire : Reading: Unit 2 – Chapter 4
Memo Writing : Reading: Unit 2 – Chapter 4
Writing a Curriculum Vitae : Reading: Unit 3 – Chapter 5
News Releases : Reading: Unit 3 – Chapter 5
Writing Business Letters : Reading: Unit 3 – Chapter 6
Writing Business Reports : Reading: Unit 3 – Chapter 6
Writing Technical Reports and Giving Presentations : Reading: Unit 3 – Chapter 6

Intended Learning Outcomes (ILOs)

A- Knowledge and Understanding Skills.

After completing this module, students will be able to:

A1- Understand how Technical Reports is organized.
A2- Recognize how to write a Curriculum Vitae, Business Letters, and Reports.
A3- Demonstrate ability to integrate sources into a coherent essay.
A4- Demonstrate ability to apply basic research skills.

B- Intellectual Skills.

After completing this module, students will be able to:

B1- Identify and present the reports using slides or computer software.
B2- enhance basic research skills including finding reliable sources and integration of sources into a coherent essay.
B3- Produce a report with an outline and a simplified "Reference" page.
B4- Integrate graphical, visual and statistical information into the reports.
B5- Paraphrase, summarize and analyse the texts needed to incorporate in the reports.

C- Professional and Practical Skills.

After completing this module, students will be able to:

C1- Analyze the quantitative and qualitative data obtained from questionnaires.
C2- Analyze the texts needed to incorporate in the reports, and identify graphical and visual information.
C3- Apply general and personal skills to Produce a variety of sentence structures to upgrade writing style using appropriate punctuation.
C4- Analyze and Plan the essay/ write an outline using main and supporting ideas.

D- General and Transferable Skills

After completing this module, students will be able to:

D1- Develop Creativity and Critical Thinking.
D2- Develop Information Literacy.
D3- Develop Communication Skills.
D4- Develop oral presentation skills.

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Useful Websites

- http://www. www.io.com
- http://www.better.english.com
- http:// www.eslcafe.com

Reference Text

- kitty Locker, Donna Kienzler, "Business and Administrative Communication", 8th ed., 2008.

Assessment Scheme

- Weekly assignment.
- Individual term project.
- Unseen Mid-Term Exam (1.5 Hr exam).
- Unseen Final-Exam (3 Hrs exam).

Assessment Pattern

• Class participation	5%
• Assignments	10%
• Quizzes	15%
• Term Project	10%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	3	hrs / week
• Total class contact hours	45	hrs / semester
• Total self study hours	45	hrs / semester
• Total study hours	90	hrs / semester

Module Leader

Staff

200's LEVEL MODULES
First Semester

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: MAT 251**
Title	**: Linear Algebra**
Level	**: 2**
Credit Hours	**: 3**
Prerequisites	**: MAT 161**

AIMS

This module is designed to enable students to analyse matrices and systems of linear equations, determinants, complex numbers and variables, eigenvalues and eigenvectors, engineering applications.

SYLLABUS

Topics
Matrices – Matrices having Special Forms – Matrix Operations.
Determinants – Properties of Determinants.
Inverse of a Matrix – Inverse of a Matrix using Adjoint Matrix – Elementary row operations- Elementary matrices- Row Equivalence- Inverse of a Matrix by Elementary Row Operations.
System of Linear Equations – Echelon Forms – Gauss Elimination – Homogeneous System of linear Equations – Pitfalls of Elimination Methods – Techniques of Improving Solutions – Solving Linear system of equations using Gauss-Jordan – LU- factorization -Gauss-Seidel Method.
Vector spaces – Subspaces – Linear Independence – Basis and Dimension- Row Space, Column Space and Null Space of a matrix- Rank of a matrix.
Inner Product Spaces – Inner Products – Angle and Orthogonality – Orthogonal Bases – Gram-Schmidt Process – Orthogonal Matrices.
Eigen Values and Eigen Vectors – Diagonalization - Orthogonal Diagonalization.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this module, students will be able to:

A1- Recognize and understand the theory of Linear Algebra, matrices and determinants.

A2- Discuss the concepts and methods of inverses of matrices, methods of solving systems of equations, vector spaces and their applications, orthogonalization and its applications, and eigenvectors and eigenvalues.

A3- Explain the basic concepts of linear algebra to prepare them for further studies in differential equations and its applications in engineering. Explore the various modern mathematical techniques used in Linear Algebra applications.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Solve problems by suitable mathematical techniques in linear algebra.

B2- Examine the various mathematical terminology to be able to understand the varios modern techniques and applications .

B3- Propose different ideas and techniques of linear algebra to a related communication and industrial fields.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Use methods of linear algebra in solving practical problems and concluding them.
C2- Examine the results to determine if the results and numbers logical or not.
C3- Apply techniques of linear algebra to any real practical problem in communications related fields and applications.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Understand professional responsibilities.
D2- Understand ethical responsibilities.
D3- Communicate and share ideas ethically in any team work.

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Software Requirements:

- MAPLE, DRIVE, MATHEMATICA, MATLAB

Useful Websites:

- http://www.numbertheory.org
- http://www.math.odu.edu

Reference Text:

- Kolman Bernard, and David R. Hill , Elementary Linear Algebra with applications, Pearson Education Inc, 9th ed., 2008

Supplementary Readings:

- D.C. Lay and S. R. Lay, Linear Algebra and Its Applications, 5thEd., 2014.
- Larson, Edwards and Falvo, Elementary Linear Algebra, 6th ed., Houghton Mifflin, 2004.
- Anton, H., and Rorres, C; Elementary Linear Alegbra with Application, Wiley, 10thEd., 2010.

Assessment Scheme

- Assignments.
- Participation
- Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**1000%**

Learning Unit Contact Hours Per Week

• Lectures	2.5 hrs / week
• Tutorials	1 hrs / week
• Total class contact hours	52.5 hrs/semester
• Total self study hours	52.5 hrs/semester
• Total study hours	105 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	: **BSC 252**
Title	: **Modern Physics**
Level	: **2**
Credit Hours	**: 3**
Prerequisites	: **BSC 162**

AIMS

This module is designed to cover in depth the special theory of relativity, black body radiation and the photoelectric effect, the Compton Effect, wave properties of a particle, the uncertainty principle, Bohr's theory of atom and atomic spectra, quantum mechanical model of the Hydrogen atom, the electron Spin, the Zeeman Effect, and Laser.

Topic
Special theory of relativity – The relativity of time and length
Relativistic velocity, mass, momentum, energy, and force
Black Body Radiation
Thermal radiation and Planck's Postulate for energy quantization
Particle like properties of radiation – Photons (Dual Nature of Light)
Photo electric effect, X-ray, and Compton effect
Atomic models and Bohr's model of the atoms
Atomic Spectra
Wavelike properties of particles – de Broglie's postulate (Dual Nature of Particles)
Mater waves and Wave-Particle Duality
Heisenberg's uncertainty principle
Schrödinger's theory of quantum mechanics
Energy quantization
Pauli's Exclusion principle
Orbital angular momentum in quantum mechanics
Intrinsic angular momentum (spin) and the Zeeman effect
X-Ray spectra
Magnetic Dipole Moment and Total Angular Momentum
Lasers

Laboratory Experiments:

- Determining the wavelength of a monochromatic light using Newton's rings.
- Determining the specific rotation of polarized light by sugar solution.
- Determining the energy gap of a semiconductor.
- Verification of inverse square law.
- Determining the wavelength of a monochromatic light using single slit diffraction.
- Verification of Heisenberg's uncertainty principle.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this module, students will be able to:

A1- Recognize the basic physical principles in order to correctly answer conceptual questions in *Modern Physics*.

A2- Understand the basic knowledge of special relativity, Black body radiation, Bohr model, Photoelectric effect, Wave-particle duality, Heisenberg's Uncertainty Principle, Pauli Exclusion Principle, quantum mechanics of atoms and molecules, Zeeman effect, X-Ray spectra, Lasers, and apply all of these knowledge to the solution of problems.

A3- Collect and interpret experimental data to extract valid conclusions, while making an appropriate safety assessment.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Investigate the relations and differences between different physical concepts of *Modern Physics*.

B2- Analyze the mechanical properties of materials according to the loads applied.

B3- Relate the crystal structure with phase diagram and mechanical properties of metals.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1. Apply the ASTM for testing of different materials and examine their mode of failure.

C2. Practice testing experiments to define different modes of failure and interpret the results.

D. General and Transferable Skills

After completing this module, students will be able to:

D1. Create leadership, team work abilities.

D2. Practice scientific research and presentation.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Projects

Learning Materials

Hardware Requirements:

- Modern physics experiments are performed in the modern physics Lab.

Reference Text:

- W. D. Callister, D. G. Rethwisch, Materials Science and Engineering: An Introduction, 2013.

Supplementary Readings:

- K. G. Budinsk, Engineering Materials: Properties and Selection, 2016.
- Kalpakjian, S., S.R.Schmid, Manuafcturing Engineering and Technology, Prentice Hall,6th ed., 2009.

Assessment Scheme

- Assignments.
- Participation.
- Tests and Quizzes.
- Individual/Group Project.

- Laboratory Test.
- Unseen Written Mid-Term Exam (1.5-hrs. Exam).
- Unseen Written Final-Exam (3 -hrs. Exam).

Assessment Pattern

• Class and Lab Participation	10%
• Assignments	10%
• Tests and Quizzes	10%
• Term Project	5%
• Final Laboratory Test	5%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100 %**

Learning Unit Contact Hours

• Lectures	2	hrs / week
• Laboratories	3	hrs / week
• Total class contact hours	75	hrs / semester
• Total self-study hours	75	hrs / semester
• Total study hours	150	hrs / semester

Module Leader:

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ESE 253**
Title	**: Electric Circuit Analysis l**
Level	**: 2**
Credit Hours	**: 3**
Prerequisites	**: BSC 162**

AIMS

This module is designed to provide students introductory topics in the electric circuits that use DC voltages and DC currents. Elements of DC circuits, basic laws and different methods of electric circuit analysis are presented. Analysis, design, and development of several examples of DC circuits are also introduced.

SYLLABUS

Units, Electrical Quantities, and Circuit Element: SI system of units and prefixes - the electrical quantities of charge, current, voltage, power, and energy**.**
Laws of Circuit Analysis: Ohm's Law, Kirchhoff's Laws – voltage divider and current divider- the wye-delta transformations- Nodal and Mesh Analysis Methods – voltage source to current source transformations and vice versa- superposition theorem.
circuit theorems: Thevenin's and Norton's **-** conditions for maximum power transfer to a load
Capacitors and Inductors: the V/I equations for capacitance or inductance – their combine in series and parallel, and calculate their stored energy.
Transient Analysis in RC or RL Circuits (first and second order) : the differential equation for the voltage or current in an RC or RL circuit- find the initial conditions and then to find the step response of an RC or RL circuit

LAB EXPERMINTS

- Equipment, Voltage, Current, and Resistance
- Circuit Analysis and Design with Measurements
- Circuit Theorems Explored Experiment
- Capacitors and Inductors
- 1st Order RC and RL Circuits
- 2nd Order RLC

LEARNING OUTCOMES

A- <u>Knowledge and Understanding</u>

After completing this course students will be able to:

A1. Describe the Elements of basic linear electric circuits.

A2. Understand circuit Basic laws and methods of circuit analysis.

A3. Illustrate the steps of each method of circuit analysis.

Skills

After completing this module, students will be able to:

B- Intellectual Skills

B1. Compare between solving methods and select the appropriate ones to solve electric circuit problems.

B2. Analyze and solve electric circuit problems.

B3. Design DC-electric circuits

C- Subject Practical Skills

C1. Implement examples of DC electric circuits.

C2. Measure currents and voltages in circuits

D- Transferable/Key Skills

D1. Conduct oral and written communication.

D2. Prepare Technical reports and presentations.

D3. Engage in team work.

Teaching/Learning Strategies

- Lectures
- Laboratories
- Team projects / Paper
- Tutorials
- Class Presentations

Learning Materials

Software Requirements

- MULTISIM and MATLAB

Useful Websites

- http://www.mitedu.freeserve.co.uk

Reference Text:

- Charles K. Alexander/ Matthew N.O. Sadiku, **Fundamentals of Electric Circuits**, Publisher Mc-Graw Hill, 2013.

Supplementary Readings:

- IEEE Circuits and Systems Magazine

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ECE 254**
Title	**: Digital Logic Design I**
Level	**: 2**
Credit Hours	**: 3**
Prerequisites	**: Co ESE 253**

AIMS

This module enables students to understand concepts in binary numbers, number base conversion**,** complements and codes**,** definition of Boolean Algebra, Boolean functions, digital logic gates, integrated circuits, Karnaugh map methods**,** and combinational logic circuits. It also enables students to design, implement and analyze different types of combinational logic circuits. Programmable Logic Devices (PLD), Field Programmable Gate Array (FPGA) and Very High Speed Hardware Languages (VHDL) are also introduced.

SYLLABUS

Topics
Digital and Analog Concepts
Number Systems, Operations, and Codes
Logic Gates
Boolean Algebra and Logic Simplification
Combinational Logic Analysis
Adders, Subtractors, and Comparators
Decoders, Encoders, and Code Converters
Multiplexers, De Multiplexers, and Parity Generataors/Checkers
Programmable Logic Devices: SPLDs and CPLDs
VHDL Program ming techniques
Field Programmable Gate Array (FPGA).

Learning Outcomes

A- Knowledge and Understanding

After completing this course students will be able to:

A1. Recognize the number systems, and the conversion from a system to another

A2. Identify the different types of complements and codes

A3. Describe the Boolean algebra and its use in simplifying logic expression.

A4. Describe the functions of the basic logic gates.

A5. Identify the structure and function of different combinational logic circuits.

A6. Understand VHDL Programming Methods.

Skills

After completing this course students will be able to:

B. Intellectual skills

B1. Use Boolean Algebra and Karnaugh map methods to simplify the design of combinational logic circuit.

B2. Design logic circuits using different approaches; either basic logic gates, universal logic gates or combinational logic gates.

B3. Distinguish between the different types of PLDs.

C. Subject practical skills

C1. Implement the designed logic circuits using any of the available resources (basic/universal logic gates, adders, comparators, decoders, encoders, MUXs).

C2. Measure and test different types of combinational logic circuits.

C3. Develop programs for PLDs and FPGAs using VHDL.

D. Transferable/key skills

D1. Conduct oral and written communication.

D2. Prepare Technical reports and representations.

D3. Develop team work

Teaching/Learning Strategies

- Lectures
- Laboratories
- Tutorials
- Individual/Group Project

Learning Materials

Useful Websites

- http://www.msstate.edu/directory

Reference Text:

- Steven T. Karris, Digital Circuit Analysis and Design with Simulink Modeling and Introduction to CPLDs and FPGAs, 2nd edition, Orchard Publications, 2007

Supplementary Readings:

- Nikrouz Faroughi, Digital Logic Design and Computer Organization: With Computer Architecture for Security, McGraw-Hill Education, 2015.
- Charles H. Roth, Jr. | Larry L. Kinney, Fundamentals of Logic Design, 7th Edition,2014.

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
• Unseen Mid-Term Exam	20%
•Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: COM 255**
Title	**: Engineering Computer Programming I**
Level	**: 2**
Credit Hours	**: 3**
Prerequisites	**: COM 155**

AIMS

This module is designed to provide students with an in depth coverage of the basics of object oriented programming in C++, which is needed for application development. It is planned to make the students well acquainted with the syntax and semantics of the C++ programming language. This is done through teaching the Input/output instructions, the different data type used in the language, the different arithmetic operations, control structures, arrays, and functions.

SYLLABUS

Topics
Basic Program Construction (identification, statement, function, comment, and process).
C++ Simple Data Types.
Constants and Variables Declaration.
Input and Output Statements (cin and count).
Output Manipulators.
Assignment Statement Mathematical Expressions.
Automatic Type Conversions and Casting.
Decision Statements (if and which).
Logical Expressions.
Repetition Statements (for, while and do).
One and Multidimensional Arrays.
String Manipulations.
Built-In Functions and User-Defined Functions.
Passing Value and Reference Arguments.
Local and Global Identifiers.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this module, students will be able to:

A1. Design and think in computing wise to develop a program for solving problems.

A2. Trace a given program and fix any logical error in the program.

A3. Divide the problem into sub-problems.

A4. Understand basics of programming and software development

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Use the VC++ tool professionally to convert logic and design into a computer program.

B2. Debug skills using VC++ tool.

B3. Innovate solutions based on non-traditional thinking and the use of latest technologies

C. Practical and Professional Skills:

C1. Practice the programming constructs via real programs on the VC++ to touch the different data structures.

C2. Apply computer programming for the design and diagnostics of digital systems.

C3. Write computer programs on professional levels achieving acceptable quality measures in software development

D. General and Transferable Skills:

D1. Conduct oral and written communication.

D2. Prepare Technical reports and presentations.

D3. Develop team work

Teaching/Learning Strategies

- Lectures.
- Computer Laboratories.
- Tutorials.
- Class Presentation.

Learning Materials

Software Requirements:

- Borland C++, VC++ Tools.

Useful Websites:

- http://www.cplusplus.com/doc/tutorial/

Reference Text:

- Robert Lafore, Object-Oriented Programming in C++, Waite Group Press, 1998.

Supplementary Readings:

- Long, L. and N. Long, Computers, Prentice Hall, 10th ed., 2002.
- Meyer, M., Explorations in Computer Science: A Guide to Discovery. Jones and Bartlett Pub, 2003.
- Cashman, T. J. and G. B. Shelly, Essential Introduction to Computers, 5th ed. Course Technology, 2003.
- Dale, N. and J. Lewis, Computer Science Illuminated, Jones and Bartlett Pub, 2002.
- Turban, E., R. K. Rainer Jr., R. E. Potter, Introduction to Information Technology, John Wiley and Sons, 2nd ed., 2002.

Assessment Scheme

- Weekly Computer Assignments
- Short computer Quizzes
- Class computer Tests

- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	10%
• Tests and Quizzes	10%
• Projects and Reports	15%
• Unseen Mid-term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	1	hrs / week
• Laboratories	6	hrs / week
• Total class contact hours	105	hrs / semester
• Total self-study hours	105	hrs / semester
• Total study hours	210	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	: **ENG 256**
Title	: **Research English Writing**
Level	**: 2**
Credit Hours	**: 3**
Prerequisites	**: ENG 166**

AIMS

This module is designed to prepare students for writing research papers and project reports and books. It provides students with the practical skills needed in writing an APA correctly documented academic research paper. It will take the students through the journey of developping and improving their ability to outline and write effectively a Literature Review Paper in the relevant area. In addition, it will present the students with the academically and ethically accepted techniques of presenting other people's work by instilling the correct use of documentation to avoid plagiarism. Intensive writing practice with a thorough guidance on using references and citing sources.

SYLLABUS

Topics
Discussing suggested areas for the research paper.
Introducing techniques of narrowing down a general area into a focus topic.
Discussing the differences between a statement of the research problem, research question(s) and hypothesis.
Introducing library skills (types and evaluation of sources, useful links).
Reading strategies (skimming, scanning, inferencing, highlighting).
Graphic organiser.
Introducing differences between a summary, paraphrase and quotation.
Applying APA in-text and full citation rules.
Introducing means of organising ideas in the literature review using transitional signals (argumentation, classification, cause and effect, chronology, compare and contrast).
Introducing the theoretical and empirical discussion and abstract sections of a research paper.
Introducing guidelines for formatting the final draft of research paper.
Intensive practice.

A. Knowledge and Understanding .

After completing this module, students will be able to:

A1. Realize how to critically evaluate an argument by understanding the different types of common fallacies.
A2. Identify different reading strategies and some mind mapping techniques.
A3. Distinguish between a statement of the problem, research question and hypothesis.
A4. Recognize the know-how of both theoretical and empirical research.

B. Intellectual Skills.

After completing this module, students will be able to:

B1. Evaluate valid/invalid sources and research papers.
B2. Brainstorm and narrow down ideas to reach a focus.
B3. Formulate a hypothesis and research questions

C. Practical and Professional Skills:

After completing this module, students will be able to:

C1. Apply different reading strategies (before, during and after reading).
C2. Produce a clear argumentative thesis statement.
C3. Produce a correctly documented academic research paper.

D. General and Transferable Skills

After completing this module, students will be able to:

D1. Develop critical and argumentative skills.
D2. Deliver an oral presentation about the research paper, and engage in debates.

Teaching/Learning Strategies

- Lectures/Tutorials
- Research Papers.

Learning Materials

Useful Websites

- http://search.ebscohost.com
- http://www.questia.com
- http://e-learning.msa.edu.eg
- http:// libguides .murdoch.edu.au/APA

Reference Text

- James-D.Lester,"Writing Research papers: A complete guide", Longman, 12th ed., 2007.

Supplementary Readings:

- Lester, J., and Lester, J.; Writing research papers: A complete guide; 12th ed.; New York: Pearson education; 2009.
- Murdoch University; APA Documentation Style; Retrieved September 12, 2011, from http://libguides.murdoch.edu. au/APA
- Spack, R.; Guidelines: A cross-cultural reading/writing text; 4th ed.; Cambridge: Cambridge University Press; 2007.

Assessment Scheme

- Quiz.
- Essay.
- Documented Research Paper on an argumentation topic.
- Unseen Mid-Term Exam.
- Unseen Final-Exam.

Assessment Pattern

• Quiz	5%
• Essay	5%
• Research paper on an argument topic	30%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	3	hrs / week
• Total class contact hours	45	hrs / semester
• Total self-study hours	45	hrs / semester
• Total study hours	90	hrs / semester

Module Leader

Staff

200’s LEVEL MODULE

Second Semester

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: MAT 261**
Title	**: Differential Equations**
Level	**: 2**
Credit Hours	**: 3**
Prerequisites	**: MAT 161**

AIMS

This module is designed to enable students to analyse differential equations, solving first and higher order of differential equations, modeling with first and higher order differential equations. Learn special functions: Gamma, Beta and Bessel Functions.

SYLLABUS

Topics
Classification of Differential Equations – Initial and Boundary Value Problems.
First Order-First Degree Ordinary Differential Equations - Separable Differential Equations – Homogeneous Differential Equations – Exact Differential Equations – Integrating Factors– Linear Differential Equations – Bernoulli Differential Equations.
Modeling with First Order Differential Equations.
Higher Order Ordinary Differential Equations.
Homogeneous Linear Differential Equations with constant coefficients.
Nonhomogenous Linear Differential Equations - Undetermined Coefficients Method.
Variation of Parameters Method - Reduction of order.
Cauchy – Euler Differential Equations.
Modeling with Second Order Differential Equations.
Numerical Solution Of Ordinary Differential Equations.
Special Functions: Gamma, Beta, and Bessel Functions.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this module, students will be able to:

A1- Recognize the importance of the theory of differential equations and understand the relation between differential equations and various fields of sciences.

A2- Describe exact solutions for different kinds of differential equations using analytic methods.

A3- Outline the different types of differential equations and explain the use of differential equations in physical applications.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Formulate the essential facts, concepts, principles and theories related to the theory of differential equations.

B2- Propose exact solutions for initial value problems based on ordinary differential equations.

B3- Inspect solutions of linear ordinary differential equations in terms of special functions.
B4- Evaluate the solutions to determine if the results are logical or not.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Use analytic methods for solving ordinary differentia equations which appear in engineering applications.
C2- Apply the knowledge of ordinary differential equations to study physical phenomena.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Manage and arrange the workload tasks and time effectively. D2- Understand professional and ethical responsibilities.
D3- Employ recent communication and information technologies, models and tools effectively in different numerical methods.

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Software Requirements:

- MAPLE, DRIVE, MATHEMATICA, MATLAB

Useful Websites:

- www.physics.ohio-state.edumath.odu.edu
- www.courses.cs.uiuc.edu
- www.chembio.uoguelph.ca
- www.math.montana.edu

Reference Text:

- Nagle,R.Kent, Edward B.Saff, and Arthur David Snider, Fundamentals of Differential Equations, Pearson Education Inc, 8th ed., 2012

Supplementary Readings:

- Zill, D.G., A First Course in Differential Equations with Modeling Applications, Brooks/ Cole Publishing Co., 8th ed., 2005.
- Schaum'S , Schaum's Solved Problems Differential Equations, 2016.

Assessment Scheme

- Assignments.
- Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs / semester
• Total self-study hours	52.5	hrs / semester
• Total study hours	105	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ESE 262**
Title	**: Physics of Electrical Materials**
Level	**: 2**
Credit Hours	**: 3**
Prerequisites	**: BSC 252**

AIMS

This module is designed to provide introductory topics in the dielectrics, dielectric constant in DC and AC fields, local field correction, sources of polarizability, dipolar dispersion, polarizability of electrical properties, Introduction to magnetism, classification of materials, Diamagnetism and its materials, Para magnetism and its materials, Ferromagnetism, Introduction to superconductivity and magnetic fields, Perfect diamagnetism, Electrodynamics of superconductivity.

SYLLABUS

Topics
Dielectric Constant in DC and AC Fields
Local Field Correction
Sources of Polarizability
Dipolar Dispersion
Polarizability of Electrical Properties
Magnetism, Classification of Materials
Diamagnetism and its Materials
Para magnetism and its Materials
Ferromagnetism
Superconductivity and Magnetic Fields
Perfect Diamagnetism
Electrodynamics of Superconductivity

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Describe properties of dielectrics.

A2. Identify magnetic materials.

A3. Distinguish between superconductor materials at microscopic and macroscopic level.

Skills

After completing this course students will be able to:

B. Intellectual skills:

B1. Select the proper material for specific application.

B2. Evaluate the performance of the electrical materials.

C. Subject practical skills:

C1. Student must be able to understand the material classification.

C2 Investigate the variety of sensors and transducers to use in the design of electrical circuit.

D. Transferable/Key skills:

D1. The student must acquire personal and interpersonal skills, including work as team member; develop his thinking, and mange time.
D2. Prepare technical presentations.
D3. Engage in team work.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Team projects / Paper
- Class Presentations.
- Laboratories

Learning Materials

Useful Websites

- http://www.motionnet.com/cgi-bin/sear

Reference Text:

- Kasap, S. O., Principals of Electrical Engineering Materials and Devices, McGraw−HILL.,2000.

Supplementary Readings:

- IEEE Solid State Circuits Magazine 2000 ant up.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader

Staff

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ESE 263**
Title	**: Electrical Circuit Analysis ll**
Level	**:2**
Credit Hours	**:3**
Prerequisites	**: ESE 253**

AIMS

This module is designed to enable students to understand concepts in Alternating Current (AC), steady-state analysis, node-voltage method, mesh-current method, Thevenin's and Norton's equivalent circuits, sinusoidal steady-state power calculation, average, reactive, complex , and maximum power, power factor, resonance, filters, and balanced three-phase circuits.

SYLLABUS

Topics
Introduction to AC : AC magnitude, AC phase
Complex Numbers Vectors and AC waveforms – complex vector operations – Polar and rectangular notation – Complex number arithmetic
Reactance and impedance: AC resistor, inductor, capacitive circuits - Series and parallel impedances- Susceptance and Admittance
Reasonance: Simple parallel (tank circuit) resonance - Simple series resonance - Applications of resonance - Resonance in series-parallel circuits - Q and bandwidth of a resonant circuit
Mixed-frequency ac signals: Square wave signals - Other waveshapes - More on spectrum analysis
Filters: Low-pass filters - High-pass filters - Band-pass filters - Band-stop filters - Resonant filters
Mutual inductance: circuits has magnetic coupling- T equivalent circuit for two coupled coils.
Polyphase ac circuits: Single-phase power systems -Three-phase power systems - Phase rotation - Three-phase Y and Δ configurations
Power factor: Power in resistive and reactive AC circuits - True, Reactive, and Apparent power - Calculating power factor

LAB EXPERMINETS

- Measurement of the peak value and the period of periodic waveforms, using the oscilloscope.
- Resistive elements in AC circuits
- Inductive elements in AC circuits
- Capacitive elements in AC circuits
- Resonant circuits
- Filters: output voltage-time characteristics.

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this course students will be able to

A1. Understand the behavior of linear circuit elements in AC circuit

A2. Recognize differences in response between inductive and capacitive circuits.

A3. Illustrate the steps of each method of AC circuit analysis

Skills

After completing this course students will be able to:

B- Intellectual Skills

B1. Transform variables of AC circuits from time domain into frequency domain and vice versa.

B2. Compare between solving methods and select the appropriate ones to apply to AC electric circuits.

B3. Analyse and solve AC electric circuit problems.

B4. Design AC-electric circuits.

C- Subject Practical Skills

C1. Implement examples of AC electric circuits.

C2. Measure currents and voltages in AC circuits

D- Transferable/Key Skills

D1. Conduct oral and written communication.

D2. Prepare Technical reports and representations.

D3. Engage in team work.

Teaching/Learning Strategies

- Lectures
- Laboratories
- Tutorials
- Team projects

Learning Materials

Software Requirements

- P Spice and MULTISIM

Useful Websites

- http://www.analyzethat.net

Reference Text:

- Charles K. Alexander/ Matthew N.O. Sadiku, **Fundamentals of Electric Circuits**

Supplementary Readings:

- IEEE Circuits and Systems Magazine

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 264**
Title	**: Digital Logic Design II**
Level	**: 2**
Credit Hours	**: 3**
Prerequisites	**: ECE254**

AIMS

This module is designed for enabling students to understand concepts in sequential logic circuits and Memory modules. Design and analysis of sequential logic circuits such as: Shift Registers, Counters, Synchronous and Asynchronous Sequential Circuits, State Diagrams, State Tables, Finite State Machines and integrated circuits technology are also introduced, Students will be able to develop, measure, and test different types of Sequential Circuits using D-type, T-type and JK-type Flip-Flops.

SYLLABUS

Topics
Sequential Logic Circuits types and operation analysis
Latches and Flip Flops: S-R, D, T, J-K
Multivibrators: Mono stable, Bistable, and Astable Multivibrators
Counters: Syncronous, Asynchronous, Up and Down, Cascadded Counters.
Shift Registers: Unidirectional S.R, Bidirectional S.R, and Shift Register Counters.
Finite State Machines: Mealy and Moore Finite State Machines
Memory: RAM, ROM, Cash Memory, and Flash Memory
Memory Expansion
Stacks and Ques
Digital Integrated Circuits Technologies.

Learning Outcomes

A. Knowledge and understanding

After completing this course, students will be able to:

A1. Recognize the structures and function s of Latches, Flip-Flops, Counters, Registers, and Multivibrators.

A2. Identify the characteristics of Synchronous and Asynchronous Sequential Circuits.

A3. Define the state diagrams and state tables

A4. Understand the types and operation of Memories.

A5. Acquire knowledge associated with the different types of Integrated Circuits.

Skills

B. Intellectual skills

After completing this course students will be able to:

B 1. Design sequential logic circuits using different approaches.

B2. Classify between the types of memories.

B 3. Distinguish between the types of ICs technologies.

C. Subject practical skills

After completing this course students will be able to:

C 1. Implement the designed circuit using any of the available resources/devices.

C2. Measure and test the different types of sequential logic circuits.

C3. Construct large memory capacity from the available small ones.
C 4. Choose the best ICs for implementing the required logic circuits.

D. Transferable/key skills

After completing this course students will be able to:

D1. Conduct oral and written communication.
D2. Prepare Technical reports and representations. D3. Develop team work.

Teaching/ Learning Strategies

- Lectures
- Laboratories
- Tutorials
- Individual/Group Project

Learning Materials

Useful Websites

- http://www.msstate.edu/directory

Reference Text:

- Mano, M.M., *Digital Design*, Fourth Edition, Prentice hall, 2006

Supplementary Readings:

- Floyd, T.L., *Digital Fundamentals*, tenth Edition, Prentice hall, 2009.
- Hwang, E.O., *Digital Logic and Microprocessor Design with VHDL*, Lecture Notes, La Sierra University, Brooks/Cole 2005
- Rabaaey, Jan M., Anantha Chandrakasan and Vorivoje Nikollic, *Digital Integrated Circuits*, 2/E Prentice Hall, 2003.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader

Staff

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	: **COM 265**
Title	: **Engineering Computer Programming II**
Level	: **2**
Credit Hours	: **3**
Prerequisites	: **COM 255**

AIMS

This module is designed to provide students with an in depth coverage of more advanced features of the C++ language, such as two dimensional arrays, structures, pointers and the main concepts of object orientation including designing classes and creating objects from them, operators and function overloading, class containment, inheritance, function overridden, polymorphism, multiple inheritance, abstract classes and default parameters.

SYLLABUS

Topics
Two Dimensional Arrays.
Structures and Arrays of Structures.
Pointers.
Classes Usage and Declaring.
Objects as Function Arguments.
Operator Overloading.
Inheritance.

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this module, students will be able to:

A1. Learn how to be a team member or a team-leader in a medim-size/large project.

A2. Differentiate between static and dynamic allocation, and which one to choose.

A3. Understand basics of programming and software development

Skills

After completing this module, students will be able to:

B- Intellectual Skills:

B1. Design and think in computing wise to develop a program for solving problems.

B2. Trace a given program and fix any logical error in the program. B3. Divide the problem into sub-problems.

C- Practical and Professional Skills:

C1. Practice the programming consturcts via real programs on the VC++ to touch the different data structures.

C2. Employ VC++ tool professionally in developing a large project.

C 3. Evaluate how to be a team member or a team-leader in a medim-size/large project

C 4. Use the VC++ tool professionally to convert logic and design into a computre program.

C 5. Debug skills using VC++ tool.

C6. Apply computer programming for the design and diagnostics of digital systems.

D- General and Transferable Skills:

D1. Conduct oral and written communication.

D2. Prepare Technical reports and representations.

D3. Develop team work.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Computer Laboratories
- Class Presentation.

Learning Materials

Software Requirements:

- Borland C++, VC++ Tools.

Useful Websites:

- http://www.cplusplus.com/doc/tutorial/

Reference Text:

- Robert Lafore, Object-Oriented Programming in C++, Waite Group Press, 2002.

Supplementary Readings:

- Long, L. and N. Long, Computers, Prentice Hall, 10th ed., 2002.
- Meyer, M., Explorations in Computer Science: A Guide to Discovery. Jones and Bartlett Pub, 2003.
- Cashman, T. J. and G. B. Shelly, Essential Introduction to Computers, 5th ed. Course Technology, 2003.
- Dale, N. and J. Lewis, Computer Science Illuminated, Jones and Bartlett Pub, 2002.
- Turban, E., R. K. Rainer Jr., R. E. Potter, Introduction to Information Technology, John Wiley and Sons, 2nd ed., 2002.

Assessment Scheme

- Weekly Computer Assignments
- Short computer Quizzes
- Class computer Tests
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	10%
• Tests and Quizzes	10%
• Projects and Reports	15%
• Unseen Mid-term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• lectures	1	hrs / week
• Laboratories	6	hrs / week
• Total class contact hours	105	hrs / semester
• Total self-study hours	105	hrs / semester
• Total study hours	210	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code : **HUM 266**
Title : **Project Management Systems**
Level : **2**
Credit Hours : **3**
Prerequisites : **ENG256**

AIMS

This module is designed to provide students with an analysis of real world complex project systems including planning phase, scheduling phase and control phase. The Planning Phase includes network development, precedence diagramming as well as expansion, condensation and elimination of activities. The scheduling phase includes deterministic and probabilistic duration times, forward and backward passes computation, slack time calculation, and critical path identification. The control phase includes cost control monitor, resource constrains, and time-cost tradeoff. Organization staffing and evaluating alternatives are also included Real case studies.

SYLLABUS

Topics
Principles of Project Management.
Project Planning Phase.
Structure of Networks.
Duration Time Estimates: Deterministic and Probabilistic.
Project Scheduling Phase.
Basic Scheduling Computations.
Slack Time Computation, Critical Path Identification
Project Control Phase.
Resource Constraints and leveling.
Time-Cost Trade-Off and Crashing.
Real Case Study.

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this module, students will be able to:

A1. Review the basic concepts and principles of project management.

A2. Develop an in-depth understanding of the three phases of project management: planning phase, scheduling phase and control phase.

Skills

After completing this module, students will be able to:

B. Intellectual Skills:

B1. Apply project management software to create project management documents such as work breakdown structures, Gantt charts, network diagram, schedules, financial reports and status reports; as well as to complete project management analyses such as sensitivity analysis, resource allocation, leveling and cost analysis.

B2. Plan and analyze of the project managemenet phases through real case studies.

B3. Plan to communicate potentialities and strategies for resolving issues which occur during the project.

C- Practical and Professional Skills

After completing this module, students will be able to:

C1. Plan and undertake a major individual project.

C2. Apply the acquired skills in a commercial or industrial environment

D- General and Transferable Skills

After completing this module, students will be able to:

D1. Understand the engineering relationships between the management tasks of planning, organization, leadership, control, and the human elements in production, research and service organizations

D2. Demonstrate the ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment, and energy.

Teaching/Learning Strategies

- Lectures.
- Individual Project.
- Tutorials.
- Class Presentation

Learning Materials

Software Requirements:

- Win QSB, MS Project 2003.

Useful Websites:

- http://www.csiwin.com
- http://www.jsaproj.com
- http://www.arch.uiuc.edu
- http://www.criticaltools.com
- http://www.cher.eda.doc.gov

Reference Text:

- Nicholas, John M. , "Managing Business and Engineering Projects", Prentice Hall, 2nd ed.,2001.

Supplementary Readings:

- Moder, J.J., Philips, C.R. and Davis, E.W., Project Management with CPM, PERT and Precedence Diagramming, Blitz Publishing Co., U.S.A., 3rded., 1983.
- Cleland,D. I., and W.R. King. Project Management Handbook. New York: Van Nostrand Reinhold Co., 1984.
- Keefer, D.L., and W.A. Verdini. Better Estimation of PERT Activity Time Parameters. Journal of Management Science, 1993.
- Kerzner, H., and H. Thamhain. Project Management for Small and Medium Size Business. Van Nostrand Reinhold Co., 1984.

- Kim, S., and R.C. Leachman. Multi-Project Scheduling with Explicit Lateness Costs., IIE Transactions, 1993.
- Cleland, D. I., Project Management, McGraw-Hill, 3rd ed., 2004.

Assessment Scheme

- Weekly written Assignments
- Short written Quizzes
- Class written Tests
- Individual Projects.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Assignments	10%
• Tests and Quizzes	10%
• Term Project and Reports	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	3	hrs / week
• Total class contact hours	45	hrs / semester
• Total self-study hours	45	hrs / semester
• Total study hours	90	hrs / semester

Module Leader

Staff

300’s LEVEL MODULES

First Semester

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	: **MAT 351**
Title	: **Mathematical Analysis and Numerical Methods**
Level	: **3**
Credit Hours	: **3**
Prerequisites	: **MAT 261**

AIMS

This module is designed to introduce students to Fourier and Laplace Transforms. It also enables students to analyse the mathematical modeling of engineering problems, solving problems using computer software, Approximation and round-off errors, Truncation errors and Taylor series, Roots of equations, Linear algebraic equations, Curve fitting, Interpolation and polynomial approximation,and Numerical integration and differentiation.

SYLLABUS

Topics
Vector Fields- Gradient Fields- Divergence and curl- Laplacian operator
Laplace Transform (Definition – Laplace transform of elentary functions- Properties– Inverse Laplace Transform- Convolution Theorem) - Fourier Analysis -Fourier Transform
Introduction to Complex variables and Complex functions.
Roots of Equations – The Bisection Method – The False–Position Method – Simple Fixed – Point Iteration – The Newton-Raphson Method.
Interpolation – Newton's Divided–Difference Interpolating Polynomials – Lagrange Interpolating polynomials.
Numerical Integration – Newton-Cotes Integration Formulas – The Trapezoidal Rule – Simpson's Rules.
Numerical Differentiation – High-Accuracy Differentiation – Formulas.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this module, students will be able to:

A1- Recognize the importance of the theory of mathematical analysis and understand the significance of numerical methods for solving mathematical problems in various fields of sciences.

A2- Discuss the theoretical bases for different mathematical fields and numerical techniques.

A3- Explain the basic methods of numerical methods to prepare them for further studies in numerical analysis and its applications in engineering. Explain the use of computer software in solving numerical problems.

A4- Review the use of computer software in solving numerical problems.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Formulate the essential facts, concepts, principles and theories related to numerical analysis.

B2- Investigate the range of solutions and critically evaluate and justify proposed design solutions.

B3- Apply numerical methods in order to investigate accurate approximate solutions for modern scientific problems whose exact solutions are hard to find.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Use numerical methods in solving practical problems and concluding them.
C2- Evaluate the numerical results to determine if the results and numbers logical or not.
C3- Apply Mathematical Analysis and Numerical techniques to any real practical physical problem.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Manage and arrange the workload tasks and time effectively.
D2- Understanding of professional and ethical responsibilities.
D3- Employ recent communication and information technologies, models and tools effectively in different numerical methods.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Projects

Learning Materials

Software Requirements:

- MAPLE, DRIVE, MATHEMATICA, MATLAB.

Useful Websites:

- http://mathforum.org/
- www.math.jbpub.com
- http://gams.nist.gov/

Reference Text:

- Chapra, S.C, Applied Numerical Methods with Matlab for Engineers and Scientists, 2nd ed.McGraw Hill, 2008

Supplementary Readings:

- Richard L. B. and J. D. Faires, Numerical Analysis, 9th Ed., Cengage,2011.
- Cleve B. Moler, Numerical computing with Matlab, 2nd ed., SIAM, 2010.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

Class Participation/Assignments	20%
Tests and Quizzes	20%
Unseen Mid-Term Exam	20%
Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Laboratory	1	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	: **CSE 352**
Title	: **Microprocessor**
Level	: **3**
Credit Hours	: **3**
Prerequisites	: **ECE 264+COM 265**

AIMS

This module is designed to provide students with an in depth coverage of microprocessor systems including microprocessor internal architecture, external signals and busses, interfacing memory devices, and interfacing input and output devices. Topics also include an introduction to assembly language programming for 8-bit microprocessors, and example of simple microprocessor-based system designs.

SYLLABUS

Topics
Microprocessor Architecture and Microcomputer Systems
Intel 8085 Microprocessor Architecture
Memory Interfacing
Interfacing Input/Output Devices
Assembly Programming
8085 Assembly Instructions
Programming Techniques
Counters and Time Delays
Interrupts, Interfacing Data Converters
Programmable Interface Devices
High-level Processors and Micro controllers
Microprocessor Applications

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this course students will be able to:

A1. Illustrate the basic hardware and software concepts of microprocessors.

A2. Differentiate between the microprocessor-based systems.

A3. Understand engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real-time systems and reliability analysis

Skills

After completing this course students will be able to:

B- Intellectual Skills:

B1. Implement microprocessor-based applications.

B2. Compose assembly language programs.

B3. Proposing various computer-based solutions to business system problems.

C- Practical and Professional Skills:

C1. Use basic hardware and software concepts of microprocessors.

C2. Integrate software and hardware modules from different vendors to design new products and/or services.

D- General and Transferable Skills:

D1. The student must acquire personal and interpersonal skills, including work as team member, develop his thinking.

D2. Demonstrate efficient IT capabilities

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Computer Laboratories.
- Team Projects / Paper.

Learning Materials

Useful Websites

- http://www.lemps.ch
- http://www.swtpc.com
- http://www.chiark.greenend.org.uk

Reference Text:

- Gaonkar, R. , Microprocessor Architecture, Programming and Applications with the 8085, Prentice Hall Inc., 2000 .

Supplementary Readings:

- IEEE Computer Magazine.
- Barrey Brey, The Intel Microprocessors, Prentice Hall, 2000.

Assessment Scheme

- Written Assignment
- Class Written Tests
- Individual Term Paper.
- Individual Project.
- Unseen Written Mid-Term Exam.
- Unseen Written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	10%
• Tests and Quizzes	5%
• Projects and Reports	10%
• Lab and computer tests	10%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader:

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 353**
Title	**: Electronic Circuits Analysis I**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**:ESE 263**

AIMS

This module is designed to provide students with introductory topics in semiconductor physics. It includes theory of operation and analysis of the P-N junction diode, Bipolar Junction Transistor (BJT`s) and Field Effect Transistors (FET`s) and their applications. It also provides considerable understanding and confidence in Engineering Electronics and develops the intellectual and practical skills necessary for Electronics Engineering area.

SYLLABUS

Topics
Introduction.
Basic Physics of Semiconductors.
Diode Models and Circuits.
Physics of Bipolar Junction Transistors (BJT), characteristics, operation, analysis of different configurations and applications.
Physics of Field Effect Transistors (FET) Transistors, characteristics, operation, analysis of different configurations and applications.

Learning Outcomes

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Understand the characteristics of Semiconductors used in electronic circuits and components.

A2. Illustrate Diodes and BJT and FET transistors DC operations.

A3. Recognize methodologies of solving electronic circuit's problems.

A4. Acquire principles of design of Diodes, BJT and FET Electronic circuits.

Skills

After completing this course students will be able to:

B. Intellectual skills:

B1. Differentiate between different types of semiconductor materials.

B2. Analyse the DC problems for BJT and MOS transistors.

B3. Assess and evaluate the characteristics of different BJT and FET biasing circuits.

B4. Develop analytical models for Diodes, BJT`s and FET`s circuits.

C. Subject practical skills:

C1. Design the diode circuits and deduce its output.

C2. Derive the Q-point of BJT and FET transistors.

C3. Synthesis different BJT and FET biasing circuits
C4. Use laboratory equipment to design Diodes, BJT`s and FET`s circuits.
C5. Use Multisim or PSPICE computer software packages to simulate the designed circuits.

D. Transferable/Key skills:

D1. Collaborate effectively within multidisciplinary team.
D2. Show the ability to present and interpret projects.
D3. Communicate effectively.
D4. Improve the ability to manage time and resources within an individual and group project.

Teaching/Learning Strategies

- Lectures.
- Laboratories.
- Tutorials.
- Team Projects / Term Paper.

Learning Materials

Useful Websites

- http://www.electroschematics.com
- http://www.electronic-circuits-diagrams.com

Reference Text:

- Sedra and Smith, Microelectronic Circuits, Oxford University press, 5th edition,2004, ISBN: 0-19-514252-7

Supplementary Readings:

- IEEE Circuits and Systems Magazine.
- Yang, E. S., Microelectronic Devices, MH, 1988.
- Thomas L. Floyed, Electronic Devices, Pearson Prentics Hall, 7th edition, 2005, ISBN: 0-13-127827-4

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2	hrs / week
• Laboratories	3	hrs / week
• Total class contact hours	75	hrs / semester
• Total self-study hours	75	hrs / semester
• Total study hours	150	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 354**
Title	**: Algorithms and Data Structures**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: COM 265**

AIMS

This module aims to allow the student to analyse and select the optimized algorithm for different problems. Optimization techniques are classified in two ways, either in terms of speed (complexity), or in terms of memory usage (volatile or secondary memory).

SYLLABUS

Topics
Analyze the efficiency of algorithms.
Recursion functions (implementation and usage).
Implement a list class.
Implement a Stack and queues.
Design of generic classes.
Recursion functions.
Searching and sorting algorithms.
Trees representation.
Binary search trees

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Explain in depth the different algorithms for data structure manipulation.
A2. Demonstrate different sort and search algorithms and the optimum search algorithm.
A3. Illustrate the use of recursion and recursion functions.
A4. Categorize the classes of problems according to complexity theory.
A5. Illustrate the use of different data compression techniques for files.

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Analyse and select the best algorithm that suits a problem.
B2. Build a robust computer program that will not crash for unexpected input.

C. Subject Practical Skills

C1. Expertly debug complicated algorithms and programs.
C2. Examine predefined algorithms and understand them.

D. Transferrable/Key Skills

D1. Communicate effectively.
D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Useful Websites:

- www.cplusplus.com/doc/tutorial/
- warrior-101.tripod.com/dstut/dstut.htm

Reference Text:

- Data Structures and Algorithm Analysis in C++ 3rd Ed. by Mark Allen Weiss, Addison Wesley Mar 10, 2006.

Supplementary Readings:

- Data Structures and Algorithms in C++, 3rd ed. Adam Drozdek, Course Technology, 2004.
- Introduction to Algorithms, 2nd ed. by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, MIT Press, 2001

Software Requirements

- VC++, or any other programming language.

Assessment Scheme

- Weekly Written Assignment
- Class Written Tests
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	5%
• Tests and Quizzes	10%
• Labs, Projects and Reports	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2	hrs / week
• Laboratories	3	hrs / week
• Total class contact hours	75	hrs / semester
• Total self-study hours	75	hrs / semester
• Total study hours	150	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 355**
Title	**: Data Communication**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: MAT251**

AIMS

This module is designed to enable students to analyze concepts in the data communication systems including protocols and standards, network configuration and topologies, analog and digital signals, encoding and modulation techniques, interfaces and modems, guided and unguided transmission media, multiplexing, and error detection and correction methods.

SYLLABUS

Topics
Network Topologies , Categories , and Transmission Modes
Analog and Digital Signals
Asynchronous Transmission and UART interface
Synchronous Transmission and USRT interface
Line Coding Techniques (NRZ, RZ, Manchester, HDB3, mLnB, etc)
Digital phase locked loop (DPLL).
Error Control Methods and Automatic Repeat Request
Transmission Media (UTP, Coaxial, Optical Fiber, Wireless, etc.)
Transmission impairment and Performance
FDM, TDM, and WDM
Digital Multiplexing

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A.1. Analyse current engineering technologies related to data communication systems.

A.2. Differentiate different protocols and standards with signal analysis

B. Intellectual Skills

After completing this course students will be able to

B.1.Analyse the performance of data communication systems

B.2.Select appropriate solutions for data communication systems problems based on analytical thinking.

B.3. Exchange knowledge and skills with data communication systems engineering community and industry

C. Subject Practical Skills

C1. Apply knowledge of mathematics, science, information technology, and engineering practice integrally to solve linear systems and signals problems.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Class Presentations.
- Laboratories
- Tutorials.
- Office

Learning Materials

Useful Websites

- http://www.sff.net/people/jeff.hecht/history.html

Reference Text:

- Behrouz Farouzam, Data Communication and Networkig, 3rd Ed., McGraw Hill, 2011

Supplementary Readings:

- IEEE Communications magazine, releases 2000 and up.
- Halsall, F., Computer Networking and the internet , 5th edition , Addison Wesley , 2005.

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs / semester
• Total self-study hours	52.5	hrs / semester
• Total study hours	105	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	:	**ECE356**
Title	:	**Electronic Measurement Instruments**
Level	:	**3**
Credit Hours	:	**3**
Prerequisites	:	**ESE263**

AIMS

This module is designed to enable the student to analyze concepts in electrical units, various classes of standard functions and characteristics of instruments and different types of errors, Electromechanical indicating instruments, Electrical measurements for measuring basicparameters, D.C. and A.C. Bridge measurements, Instrument transformers, Electronic Instruments, Digital Instruments, Display devices and Recorders, Function Generator, Oscilloscope, Calibration instruments, Sensors and Transducers

SYLLABUS

Topics
Units and Standards of measures
Measurement and Instrumentation
Static and Dynamic characteristics
Errors in measurements – Statistical analysis
Electromechanical Instruments
Instrument Transformers
D.C. and A.C. Bridge Instruments
Electronic Instruments
Digital Instruments
Display devices and Recorders
Sine Wave Generator
Oscilloscope
Calibration Instruments
Sensors and Transducers

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course, students will be able to:

A1. Define the units and standards of measures.

A2. Recognize the basic concepts and techniques of measuring physical electrical and electronic quantities.

A3. Understand the operations of the different types of measuring Instruments and display instruments.

A4. Recognize structure and function of Sensors, Transducers, and Actuators.

Skills

After completing this course, students will be able to:

B. Intellectual Skills:

B1. Analyze the errors in the measurements.

B2. Explain the operation of different types of measuring instruments and display instruments.

B3. Analyze the electronic circuits of the measuring instrument and display instruments.

B4. Evaluate the effect of the measuring instruments on the measured values. B5. Analyze the different types of Transducers and Sensors.

C. Subject Practical Skills:

C1. Use efficiently the laboratory Instrumentation.

C2. Analyze the parameters of different measuring and displaying devices.

D. Transferrable/Key Skills:

D1. Show the ability for team work and collaboration at laboratory exercises. D2. Develop the critical thinking

D3. Write technical report

D4. Develop the time management

Teaching / Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Team projects / Paper
- Class Presentation

Learning Materials

Useful Websites

- http://www.innstme.org.uk

Reference Text:

- David A. Bell " Electronic Instrumentation And Measurements" Oxford University Press, Third Edition, ISBN 13-978-0-19-569614-1,2013

Supplementary Readings:

- Curtis D. Johnson "Process Control Instrumentation Technology, Prentice Hall of India,7th edition,2003.
- IEEE Electron Devices Magazine 2000 up to 2008.
- R.K.Rajput "Electronic Measurements and Instrumentation" S.Chand Company Ltd. New Delhi-2008.
- J.B.Gupta " Advanced Measurements and Instrumentation" S.K.Kataria and sons, 2005.

Assessment Scheme

- Written Assignment
- Individual Project and paper
- Laboratory Tests
- Unseen Written Mid-term Exam
- Unseen Written Final-Exam.

Assessment Pattern

• Class Participation	5%
• Assignments/Portfolio	5%
• Tests and Quizzes	10%
• Lab/Att/ Part/	10%
• Final lab	10%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Units Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

300’s LEVEL MODULES

Second Semester

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	: **MAT 361**
Title	: **Probability and Statistics**
Level	: **3**
Credit Hours	: **3**
Prerequisites	: **MAT 351**

AIMS

This module is designed to enable students to analyse random numbers and random variables, measures of central tendency, measures of dispersion, probability theory, discrete and continuous statistical distributions, sampling methods, testing hypotheses, goodness of fit tests, auto and cross correlation coefficients, and random processes.

SYLLABUS

Topics
Presentation of Data.
Measures of Central Tendency.
Measures of Dispersion.
Fundamentals of Probability.
Discrete Probability Distributions: Binomial and Poisson
Continuous Propability Distributions: Uniform, Exponential and Normal.
Sampling Distribution.
Random processes and cross correlation
Confidence Limits and Confidence Interval.
Significance Testing Hypotheses: X^2-test and Goodness of Fit Test.
Correlation : Measurement, and Coefficients.
Regression Analysis and Least Squares Method.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this module, students will be able to:

A1- Recognize and understand the theory of probability, both discrete and continuous, distributions, expectation and variance.

A2- Understand the statistical concepts and methods to explain the basic methods of statistics to prepare them for further studies in statistics and its applications in engineering.

A3- Describe abstract and critical reasoning by studying logical proofs and the axiomatic method as applied to basic probability.

B. Intellectual Skills

After completing this module, students will be able to:

B1- Formulate probability and statistical methods in modeling and prediction.

B2- Formulate hypothesis testing for single sample and two samples in terms of means, variances, and proportions.

B3- Apply different ideas and techniques of probability distributions to related communication and industrial fields.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Use statistical and probability methods in solving practical problems and concluding them.
C2- Evaluate the results to determine if they are logical or not.
C3- Apply statistical and probabilistic techniques to solve some engineering problems in communication-related fields and applications.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Manage and arrange the workload tasks and time effectively.
D2- Understand the professional and ethical responsibilities.
D3- Communicate and share ideas ethically in any team work.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Projects

Learning Materials

Software Requirements:

- MINITAB, SPSS, MICROSTAT, SAS.

Useful Websites:

- http://www.mathforum.org/library/topics
- http://www.math.uah.edu
- http://www.stat.stanford.edu

Reference Text:

- Montgomery, D. C., and G. C. Runger, "Applied Statistics and Probability for Engineering", John Wiley and Sons Inc., 4th ed., 2007.

Supplementary Readings:

- Johnson, R. A. and Bhattacharyya, G. K., Statistics: Principles and Methods, John wiley Inc., New Eddition.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam.
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs / semester
• Total self-study hours	52.5	hrs / semester
• Total study hours	105	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Cod**: CSE362**
Title **: Digital System Interfacing**
Level **: 3**
Credit Hours**: 3**
Prerequisites**: CSE352 + COM265**

AIMS

This module is designed to enable students to understand the hardware and software features of the Digital System Interfacing. It helps students to differentiate between Microcontrollers and Microprocessors architectures, functions, and applications. It introduces students to the different types and technologies of microcontrollers and their peripherals; characteristics and operations of different interfacing types, standard communication specifications and design techniques; control of communication interfaces and related peripherals , Instruction sets, assembly language, and finally some microcontroller-based-system applications.

SYLLABUS

Topics
Introduction to Microcontrollers
Microprocessors vs. Microcontrollers
Internal Structure of Microcontrollers
Interfacing Techniques: Serial and parallel interfaces
Instruction set and Assembly Language Programming
Timer Operations and Interrupts
Microcontroller Programming using: Assembly language, C-Language, Basic-Language
Design and Interface Examples
Microcontroller-based system projects

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Compare between microprocessors and microcontrollers
A2. Acquire data and knowledge needed for Digital System Interfacing. A3. Understand different types of interfacing and microcontrollers.
A4. Differentiate between microprocessor-based systems and microcontroller-based. Systems.
A5. Identify the needs to develop an embedded software system.

B. Intellectual skills

After completing this course students will be able to:

B1. Design Microcontroller-based systems needed for real life applications.
B2. Design experiments to validate and verify the functionality of the developed systems. B3.Analyse the results of the designed experiments.

C.Subject practical skil

After completing this course students will be able to:

C1. Implement Microcontroller-based systems needed for real life applications. C2. Programming the microcontroller for the required system.

C3. Evaluate the designed experiments to validate and verify the functionality of the developed systems.

C4. Propose the required enhancements for the designed systems.

D.Transferable/key skills

After completing this course students well be able to:

D1. Conduct oral and written communications.

D2. Prepare Technical reports and representations. D3. Engage in team work.

Teaching/Learning Strategies

- Lectures
- Laboratories
- Tutorials
- Individual/Group Project

Learning Materials

Useful Websites

- http://www.8052.com, http://www.national.com

Reference Text:

- Stewart, J.W. and K.X. Miao, *The 8051 Microcontroller: Hardware, Software and Interfacing*, Second Ed., Prentice Hall, 2000.

Supplementary Readings:

- Craig, S., *The 8052 Tutorial and Reference*, Vault Information Services, 2004.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam.
- Unseen written Final-Exam.

Assessment Pattern

Class Participation/Assignments	10%
Tests and Quizzes	10%
Lab/Projects	20%
Unseen Mid-Term Exam	20%
Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 363**
Title	**: Electronic Circuits Analysis II**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: ECE353**

AIMS

This module is designed to enable students to understand, design, and analyze electronic circuits that contain Bipolar Junction Transistors (BJT`s) and Field Effect Transistors (FET`s). It includes the operation and analysis of BJT and FET amplifiers and study the frequency response of both. It provides analysis of multistage amplifiers and current sources. It also provides considerable understanding and confidence in Engineering Electronics and develops the intellectual and practical skills necessary for Electronics Engineering area.

SYLLABUS

Topics
Introduction
BJT Frequency Response.
BJT Single Stage Amplifiers.
MOS Frequency Response
MOS Single Stage Amplifiers.
Current Mirror
Multistage Amplifiers.

Lab Experiments

1- BJT amplifiers Common Emitter, Common Collector and Common Base.
2- MOS amplifiers Common Source, Common Drain and Common Gate.
3- Current Mirror.

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this course students will be able to:

A1. Understand the frequency response of amplifiers.
A2. Illustrate the effect of external capacitors and internal transistor capacitors on the frequency response of BJT and MOS amplifiers.
A3. Recognize methodologies of solving single stage and multi stage amplifier circuit problems and current sources.
A4. Acquire principles of design of BJT and FET amplifier circuits, Current sources and multistage amplifiers.

Skills

After completing this course students will be able to:

B- Intellectual skills:

B1. Differentiate between different configurations of BJT and FET amplifier circuits.
B2. Analyze the amplifier circuits for BJT and MOS transistors, current sources

and and multistage amplifiers.

B3. Assess and evaluate the characteristics of different BJT and FET amplifier circuits.

B4. Develop analytical models for BJT`s and FET`s amplifier circuits.

C- Subject practical skills:

C1. Design single stage and multistage BJT and FET amplifier circuits.

C2. Derive the lower and higher cutoff frequencies and band width of such amplifiers.

C3. Synthesis current sources and multistage amplifier circuits.

C4. Use laboratory equipment to design BJT`s, FET`s, current source and multistage circuits.

C5. Use Multisim or PSPICE computer software packages to simulate the designed circuits.

D- Transferable/Key skills:

D1. Collaborate effectively within multidisciplinary team. D2.

Show the ability to present and interpret projects.

D3. Communicate effectively.

D4. Improve the ability to manage time and resources within an individual and group project.

Teaching/Learning Strategies

- Lectures.
- Tutorials
- Laboratories
- Team Projects /Term Paper

Learning Materials

Useful Websites

- http://www.electroschematics.com
- http://www.electronic-circuits-diagrams.com

Reference Text:

- Sedra and Smith, Microelectronic Circuits, Oxford University press, 5th edition, 2004, ISBN: 0-19-514252-7

Supplementary Readings:

- IEEE Circuits and Systems Magazine
- Yang, E. S., Microelectronic Devices, MH, 1988
- Thomas L. Floyed, Electronic Devices, Pearson Prentics Hall, 7th edition, 2005, ISBN: 0-13-127827-4

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam.
- Unseen written Final-Exam.

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2	hrs / week
• Laboratories	3	hrs / week
• Total class contact hours	75	hrs / semester
• Total self-study hours	75	hrs / semester
• Total study hours	150	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 364**
Title	**: Operating Systems**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: CSE354**

AIMS

The main objective of this module is to introduce important concepts of modern operating systems including processes, concurrent processes, inter-process Communication, synchronization, process scheduling and deadlocks, memory management, swapping, paging, segmentation and virtual memory. Also file systems and its implementation besides the input-output systems and mass storage structure.

SYLLABUS

Topics
Operating-System Structures.
Process Management.
CPU Scheduling.
Process Synchronization.
Deadlocks.
Memory Management.
Virtual Memory.
File System interface.
File System Implementation.
Mass Storage Structure.
I/O Systems.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Demonstrate the structure and functions of an operating system.

A2. Illustrate the methods of process management, CPU scheduling and process synchronization.

A3. Characterize what is deadlocks and how they are handled.

A4. Describe memory organization and explain memory management techniques.

A5. Compare between different operating systems.

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Expertly use any operating system environment.

B2. Create any operating system component.

C. Subject Practical Skills

C1. Solve some of the common operating systems problems such as: deadlock, synchronization…etc.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Reference Text:

- Operating Systems Concepts, 6th ed. Abraham Silberschatz, Peter Bear, Galvin Greg Gagne, John Wiley and Sons, 2005.

Supplementary Readings:

- Modern Operating Systems, 2nd ed. By Andrew Tanenbaum, Prentice Hall, 2001.
- Operating Systems Internals and Design Principles, 3rd ed. by William Stallings, Prentice Hall, 1998.
- Operating Systems: A Modern Perspective Lab Update, 2nd ed. By Gary Nutt, Adison-Wesley, 2001.

Assessment Scheme

- Weekly Written Assignment (12 home Assignments).
- Class Written Tests (2 1.5-hr. Tests).
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam (2 1.5-hr. Tests).
- Unseen Written Final-Exam (3-hr. Exam).

Assessment Pattern

• Class Participation	5%
• Assignments	5%
• Tests and Quizzes	10%
• Projects and Reports	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF ENGINEERIG
MODULEOUTLINE

Module Code	**: ECE 365**
Title	**: Linear Systems**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: ESE 263+MAT351**

AIMS

This module is designed to enable students to understand concepts in linear continuous-time systems, and perform signal operations. It also introduces Laplace transform, convolution, system functions, frequency response, Fourier series and Fourier transforms.

SYLLABUS

Topics
Classification of signal sand systems
Signal operations
Properties of linear systems
System response
Classical solutions of differential equations
Continuous and discrete convolution
Time-domainmodelofsystems:differentialequations-transferfunction–state space equations
Fourier series and Fourier transforms: trigonometric – exponential-spectral contents-properties-application to modulation and demodulation
Fourieranalysisofcontinuous-timesystems:responseofperiodicandaperiodic inputs-analysis of ideal filters
The Laplace transform and transfer function representation: properties-ComputationoftheInverseLaplaceTransform-TransformoftheInput/Output Differential Equation-response to step and sinusoidal inputs-Causal Filters

LEARNINGOUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Understand the communication and electronics aspects of linear coordination

A2. Identify and classify different classes of signals

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Apply the concepts of signals and systems in the fields of circuit analysis and communication.

B2. Utilize software tools, e.g. MATLAB, to solve linear systems problems.

C. Subject Practical Skills

C1. Apply knowledge of mathematics, science, information technology, and engineering practice integrally to solve linear systems and signals problems.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures
- Lab/Software practice
- Laboratories
- Tutorials
- Office Hours

Learning Materials

Useful Websites

- http://www.links.math.rpi.edu

Reference Text:

- B.P.Lathi, Signal processing and linear systems, International Edition, Oxford University Press, 2010

Supplementary Readings:

- A. Oppenheim, A. Willsky, with Hamid, "Signals and Systems", 2nd Ed., Pearson, 2013.
- C. Phillip, J. Parr and E. Riskin, "Signal, Systems and Transforms", Int. Edition, 5th Ed., ISBN: 9781292015286, 2014.

Assessment Scheme

- Assignments
- Class written Tests/Quizzes
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs / semester
• Total self-study hours	52.5	hrs / semester
• Total study hours	105	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE366**
Title	**: Computer Networks**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: ECE 355**

AIMS

This course is designed to introduce students to the basics of computer networks. Topics include network hardware and software, OSI reference model, TCP/IP protocol stack, physical layer, data link layer and medium access control sub-layer, routing layer, transport layer, and application layer. Key concepts and technologies will be studied in this class include network architecture, protocol stack, protocol design and performance evaluation, Internet, Optical network, PSTN, cellular network, and wireless PAN/LAN/MAN/WAN.

SYLLABUS

To
Introduction to Networks: Network Services, Network Topologies, Circuit Switching and
Computer Networks: Layered Architecture- Concept of Layering, OSI Model.
The Physical Layer: Digital Transmission Fundamentals, Transmission Media, Devices
The Data Link Layer (DLC) : Error Control, ARQ, Framing - Medium Access Control
Packet Switching and the Network Layer : Datagram and Virtual Circuit Switching,
ATM and TCP/IP Networks
Telephone Networks: Network Elements, Multiplexing, Switching, Signalling, Traffic

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this course students will be able to:

A1. Identify all basic characteristics of computer networks.

A2. Compare the organization and structure of modern-day computer networks.

Skills

After completing this course students will be able to:

B- Intellectual Skills:

B1. Develop an efficient network protocol and compare between line and "air" Technologies

B 2. Apply critical thinking and problem solving in computer networks.

C- Subject Practical Skills

C1. Use various laboratory equipment as diagnostic tool to detect a faults and identify a problem in electronics or/and communication system.

C2. Analyse, design, evaluate, system behavior and test electronic or/and communication system using simulation or computer-based tool.

D- Transferable/key skills

D1. Conduct oral and written communication.
D2. Prepare Technical reports and representations. D3. Engage in team work.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group

Learning Materials

Useful Websites

- http://www.engr.wisc.edu/

Reference Text:

- Leon-Garcia and Widjaja, "Communication Networks", 2nd Edition, McGrawHill.

Supplementary Readings:

- William Stallings, "Wireless Communications and Networking", Pearson Education, 2002.
- Andrew Tanenbaum ,"Computer Networks ", 4th Edition, Prentice Hall.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

Class Participation/Assignments	20%
Tests and Quizzes	20%
Unseen Mid-Term Exam	20%
Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

Lectures	2	hrs / week
Tutorials	1	hrs / week
Laboratories	1.5	hrs / week
Total class contact hours	67.5	hrs / semester
Total self-study hours	67.5	hrs / semester
Total study hours	135	hrs / semester

Module Leader

Staff

400’s LEVEL MODULES

First Semester

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 451**
Title	**: Concepts of Programming Languages**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE354**

AIMS

This module is a comparative study of abstraction, syntax, semantics, binding times, data and sequence control, run-time resources, translators, and storage of Programming languages. Also students implement a programming project using selected programming languages, to enhance practical aspects**.**

SYLLABUS

Topics
Preliminaries Evolution of the Major Programming Languages
Bindings.
Type Checking and Scopes Data types Expressions and the
Statement-Level Control Structures.
Implementing Subprograms.
Abstract Data Types Concurrency.
Exception Handling.
Functional Programming Languages.
Logic Programming Languages.
Object-Oriented Programming Languages.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Illustrate the basic components of a programming language.

A2. Categorize different programming languages considering abstraction, syntax, semantics, binding times, data and sequence control, run-time resources, translators and storage.

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Differentiate between different programming languages.

B2. Select the appropriate programming language for a given programming problem.

C. Subject Practical Skills

C1. Practice with any programming language faster and easier.

C2. Utilize different programming languages to solve a programming problem.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Reference Text:

- Concepts in programming languages, by John Mitchell, Cambridge University Press, 2003.

Supplementary Readings:

- Essentials of programming languages, 2nd ed., by Daniel P. Friedman, Mitchell Wand and Christopher T. Haynes, The MIT Press, 2000.
- Programming Language Concepts Paradigms, David A. Watt, Prentice Hall PTR,1994.

Assessment Scheme

- Weekly Written Assignment
- Class Written Tests
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam
- Unseen Written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	5%
• Tests and Quizzes	10%
• Projects and Reports	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2	hrs / week
• Laboratories	3	hrs / week
• Total class contact hours	75	hrs / semester
• Total self-study hours	75	hrs / semester
• Total study hours	150	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 452**
Title	**: Software Engineering**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE354**

AIMS

This module is an advanced treatment of software development techniques. Here the student will learn aspects of working with a large team on large projects to produce quality software products on time and within budget. More specifically, this module also enables students to acquire the knowledge and skills needed to the sizing, estimation and planning control of large projects, verification and validation strategies as well as techniques for rapid system development**.**

SYLLABUS

Topics
Introduction to software engineering
Socio-technical systems and Critical systems
Software processes
Agile, Extreme and other design methodologies
Critical systems specification
Architectural design
Distributed systems architecture
Rapid software development
Verification and validation

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Illustrate different software methodologies such as extreme, agile and others and the corresponding software development lifecycle.

A2. Demonstrate systems modelling, analysis and design across both architectural and behavioural specifications.

A3. Critically appraise principles and techniques for the engineering of large software projects.

A4. Demonstrate techniques and tools to support configuration management. A5.

Explain different categories of software metrics and estimation methods.

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Develop formal specifications from informal requirements of software systems.

B2. Develop formal specifications from informal requirements of software systems.

C. Subject Practical Skills

C1. Apply the appropriate software design methodologies to the process of developing large software systems.

C2. Apply techniques for scheduling and control of large projects.

C3. Construct and validate a software specification, test design completeness and correctness using CASE tools.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Computer Laboratories.
- Tutorials.
- Class Presentations.

Learning Materials

Useful Websites:

- http://www.ipd.uka.de/~tichy/patterns/overview.html

Reference Text:

- Software Engineering by Ian Somerville, Addison Wesley Publishing, 8th edition, 2006.

Supplementary Readings:

- The Project Manager's Guide to Software Engineering's Best Practices by Mark J. Christensen, Richard H. Thayer, Wiley-IEEE Press, 2002.
- Understanding Software Design Methodologies: Comparisons and Integrations, by Xiping Song, Leon Osterweil, Oxford University Press, 2003.
- Applying Use Cases: A Practical Guide, by Geri Schneider, Jason P. Winters, Ivar Jacobson, Addison-Wesley, 1998.

Software Requirements

- CASE tools such as Rational Rose, Oracle Designer

Assessment Scheme

- Weekly Written Assignment
- Class Written Tests
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam
- Unseen Written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	5%
• Tests and Quizzes	10%
• Projects and Reports	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 4531**
Title	**: Industrial Electronics in Practice**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: Min 108 credit hrs or Consents of Advisor**

AIMS

This module is designed to provide students with the necessary practical skills to design and build electronic projects, to improve his/her practical background in control systems, to use engineering software as MATLAB and SIMULINK, and to strengthen his/her practical skills in different electronic areas that might have been neglected and to improve his/her technical writing style. Lectures are designed according to the need of the projects.

SYLLABUS

Topics
Practical circuits including: Analog electronics, Digital electronic, and Control
Software application: MATLAB**,** MULTISIM

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this course students will be able to:

A1. Understand different electronic circuit operation

A2. List different software used in electronic systems design

A3. Identify the appropriate circuit for special applications

A4. List different industrial applications for electronic circuit

Skills

After completing this course students will be able to:

B- Intellectual skills:

B1. Analyze complete electronic system.

B2. Apply different software to check the functionality of electronic circuits.

B3. Extrapolate data sheet for components he/she did not use before.

B4. Analyze different applications for electronic circuits

B5. Predict electronic circuit performance under different operating conditions

B6. Construct technical reports provided with experimental verification.

C- Subject practical skills:

C1. Derive electronic circuit's diagrams

C2. Summarize simulation used for electronic circuit design

C3. Propose and design of electronic circuits

C4. Summarize operation of an industrial application to electronic circuits

D- Transferable/Key skills:

D1. Show ability for teamwork and collaboration at laboratory exercises

D2. Show the ability to present and interpret projects

D3. Acquire Personal and interpersonal skills, including work as a team member

D4. Improve the ability to manage time and resources within an individual and group project

Teaching/Learning Strategies

- Review and discussion sessions
- Laboratories
- Individual/Group Project

Learning Materials

Useful Websites

- http://www.engr.wisc.edu/

Reference Text:

- No specific reference book

Supplementary Readings:

- Scientific papers
- Engineering manuals
- Technical catalogues

Assessment Scheme

- Students are organized into groups of maximum 3 students per group.
- Each group will choose one project from the list given to them by the instructor
- Each group may modify the project but in the boundary defined by the instructor.
- Each group will break the project into parts such that each part has a special function.
- The duties are distributed among the group members.
- Each member will design; test it using software, then hardware.
- Each member will record the results of his practical part.
- Each group will submit the final dissertation by the end of the semester
- Each group will present his project in class to answer his colleague question.

Assessment Pattern

• Assignments/Participation	20%
• Tests/Quizzes	20%
• Mid-Term Exam	20%
• Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 4532**
Title	**: Advanced Operating Systems**.
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE364**

AIMS

This course expands the principles of operating systems introduced in the prerequisite to cover the advanced topics in modern operating systems, real time, multimedia systems, networks, distributed operating systems, distributed mutual exclusion, distributed deadlocks detection, load balancing, process migration, file management and organization, security and protection, fault tolerance, issues within client/server processing and object orientation.

SYLLABUS

Topics
Network Structures.
Distributed System Structures.
Distributed File Systems.
Protection.
Security.
Fault Tolerance.
Client/Server processing and Object Orientation.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Demonstrate basic concepts commonly used in network operating systems and network programming

A2. Critically appraise the advantages and limitations of peer to peer and server based NOS's.

A3. Categorize and appraise security and protection techniques.

A4. Discuss advanced features of OS such as client/server processing, object orientation and fault tolerance

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Provide a critical analysis of commercially produced NOSs from the perspective of suitability for various applications.

C. Subject Practical Skills

C1. Select, implement and manage NOSs.

C2. Select NOS suitable for a particular application

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures
- Tutorials

Learning Materials

Reference Text:

- Operating Systems Concepts, 9th ed. Abraham Silberschatz, Peter Bear, Galvin Greg Gagne, John Wiley and Sons, 2012.

Supplementary reading

- Modern Operating Systems, 2nd ed. By Andrew Tanenbaum, Prentice Hall, 2001.
- Operating Systems Internals and Design Principles, 3rd ed. by William Stallings, Prentice Hall, 1998.
- Operating Systems: A Modern Perspective Lab Update, 2nd ed. By Gary Nutt, Adison-Wesley, 2001.

Assessment Scheme

- Assignments/Labs
- Class Written Test/Quizes/Presentation
- Mid-Term Exam
- Final Exam

Assessment Pattern

● Assignments/Labs	20%
• Class Written Test/Quizes/Presentation	20%
• Mid-Term Exam	20%
● Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: CSE 4533**
Title	**: Robot Dynamics and Control**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: Min 108 credit hrs or Consents of Advisor**

AIMS

This module introduces the student to the multidisciplinary growing field of robotics. Different robot architectures and computer interfacing techniques are discussed, to apply computer controlled robotic applications. Other topics, including path planning and robot sensing, open a very wide range of applications in other modules (graduation project).

SYLLABUS

Topics
Different robotic architectures and basic parts.
Computer interfacing and robots.
Computational problems in robotics.
Robot sensing.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Differentiate between different robotic architectures and interfacing techniques

A2. Illustrate theories related to robotic motion and path planning

A3. Analyse different problems related to robotics

Skills

After completing this course students will be able to:

B. Intellectual Skills:

After completing this course students will be able to:

B1. Differentiate between different robotic architectures and interfacing techniques.

C. Subject Practical Skills

After completing this course students will be able to:

C1. Apply computer controlled robotic applications using the appropriate software.

D. Transferrable/Key Skills

After completing this course students will be able to:

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Labs

.

Learning Materials

Reference Text

- Embedded Robotics: Mobile Robot Design and Applications with Embedded Systems,3rd ed. Thomas Braunl, Springer, 2008

Supplementary Reading

Robotics, Appin Knowledge Solutions, Infinity Science Press, 2007.

Assessment Scheme

- Assignments/Labs
- Class Written Test/Quizes/Presentation
- Mid-Term Exam
- Final Exam

Assessment Pattern

• Tutorials and Class Participation	20%
• Labs and Projects	20%
• Mid-Term Exam	20%
• Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 4534**
Title	**: File Access and Management**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE354**

AIMS

This module is designed to enable students to expand the concepts of data structure introduced in the prerequisite course to develop the tools needed to design intelligent, cost-effective file structure problems. The course begins by presenting the software and hardware characteristics that combine to make file structure design important to application development. It continues with a thorough treatment of the tools that support effective use of files for storing and retrieving information.

SYLLABUS

Topics
Introduction Fundamental operations Secondary Storage: disks
Secondary Storage: Tapes, Journey of a byte, Buffering
Field and record organization, Record access, Portability and
Reclaiming space, Internal sorting, Binary Search, Key-sorting.
Indexing.
Co-sequential processing and the sorting of large files.
B-trees.
B+-trees
Hashing

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students well be able to:

A1. Explain how the computer hardware and system software affects file structure.
A2. Classify types of data structures used in creating files.
A3. Discuss the algorithms for data file sorting and searching.
A4. Acquire the foundation for studying, implementing, and effectively using database systems.

Skills

After completing this course students well be able to:

B. Intellectual Skills:

After completing this course students will be able to

B1. Adapt own knowledge of file structures to a variety of languages and peripheral storage technology
B2. Design and implement effective file structures and associated software from small to very large and complex systems.

C. Subject Practical Skills

After completing this course students will be able to

C1. Implement effective file search and sort algorithms.

D. Transferrable/Key Skills

After completing this course students will be able to

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Computer Laboratories.
- Tutorials.
- Class Presentations.

Learning Materials

Required Software

C++, Pascal.

Useful Websites

- http://www.utexas.edu/its/windows/database
- http://www.theparticle.com

Reference Text:

- Michael J Folk, Bill Zoellick, Greg Riccardi, File Structures: an object-oriented approach with C++, 3rd ed. Addison-Wesley, 1998

Supplementary Readings:

- Data Structures and Algorithm Analysis in C++, 2nd ed. by Mark Allen Weiss, Addison-Wesley, 1998
- Data Structures and Algorithms with Object-Oriented Design Patterns in C++, by Bruno R. Preiss, John Wiley and Sons, 1998
- Data Structures and Other Objects Using C++, 2nd ed. by Michael Main, Walter Savitch, Addison-Wesley, 2000
- Data Structures and Problem Solving Using Java, 2nd ed. by Mark Allen Weiss, Addison-Wesley, 2001
- Data Structures and Software Development in an Object Oriented Domain Eiffel Edition, by Jean-Paul Tremblay, Grant A. Cheston, Paul J. Tremblay, Prentice Hall,2001

Assessment Scheme

- Weekly Written Assignment
- Class Written Tests
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam
- Unseen Written Final-Exam

Assessment Pattern

• Class Participation	10%
• Assignments	10%
• Tests and Quizzes	10%
• Projects and Reports	10%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 454**
Title	**: Systems Analysis and Design**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE354**

AIMS

This course emphasizes the system analysis and design techniques for software project development. It includes: setting IS project goals, developing work plans and methods to achieve those goals, and measuring progress against a project plan. . Analyze a business need for information and develop an appropriate strategy to solve the problem and provide the required information service. Prepare and use various information gathering techniques for eliciting user information requirements and system expectations. Construct and interpret a variety of system description documents, including data flow diagrams, entity–relationship diagrams, Structured English, structure charts, use-case diagrams, ... etc. The student will design and prototype a system.

SYLLABUS

Topics
System Development Environment.
Initiating and Planning Systems Development Projects.
Information gathering techniques.
Determining Systems Requirements.
Structuring System Requirements: Process Modelling and Data flow
Structuring System Requirements: Logic Modelling and Entity

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Define and differentiate between the concepts of system life cycle, development methodology and system modelling.

A2. Illustrate the basic system modelling perspectives and the related modelling primitives.

A3. Demonstrate the main features of structured system modelling perspectives, and their advantages.

A4. Identify the advantages and limitations of different development methodologies.

Skills

After completing this course students well be able to:

B. Intellectual Skills

B1. Carry out the tasks of information gathering, cataloguing and documenting.

B2. Manage a system analysis and design project, with reference to project lifecycle Issues.

C. Subject Practical Skills

C1. Apply the concepts of data modelling, Process modelling, and Logic Modelling to a software development project.

C2. Apply the structured system analysis and design techniques to project development and prepare a set of document for the analysis, design and test phases of a project.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Computer Laboratories.
- Tutorials.
- Class Presentations.

Learning Materials

Useful Websites

- http://otn.oracle.com/
- www.uml.org
- www.comp.glam.ec.uk

Reference Text:

- Modern Systems Analysis and Design 6th ed. by Jeffrey A. Hoffer, Joey F.George, Joseph S. Valacich, Prentice Hall College, 2008.

Supplementary Readings:

- Systems Analysis and Design Methods 6th ed. by Jeffrey L. Whitten, Lonnie D. Bentley, Kevin C. Dittman, McGraw-Hill, 2008.
- Modern Structured Analysis, by E. Yourdon, 2nd ed. Prentice Hall, 2008.
- Systems Analysis techniques, by B. Robinson and M. Prior, International Thomson Computer Press, 2007.

Software Requirements

- Oracle Designer

Assessment Scheme

- Weekly Written Assignment
- Class Written Tests
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam
- Unseen Written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	5%
• Tests and Quizzes	10%
• Projects and Reports	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs / semester
• Total self-study hours	52.5	hrs / semester
• Total study hours	105	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**:ECE 455**
Title	**: Automatic Control Systems**
Level	**:4**
Credit Hours	**:3**
Prerequisites	**:ECE 356**

AIMS

This module is designed to enable students to understand concepts of dynamic systems that include electrical, mechanical, and hydraulic components. In addition, it introduces automatic control description, modeling, different control design techniques, analyzing the performance of control systems either in open loop or closed loop, transient-response analysis and steady state error analysis, basic control actions, and Lead and Lag compensators. The frequency response methods using polar plot, bode diagram and Nichol chart, the root locus methods, State space analysis of multivariable control systems, and feedback controllers are also presented.

SYLLABUS

Topics
Introduction to Control Systems: Practical issues and control system design, open loop and closed loop with advantages and disadvantages
System modeling: Electronic, electric, mechanical, and hydraulic systems- Transfer function representation- State space representation of dynamic systems- Electromechanical Systems - Transfer function and block diagram reduction – Signal flow graph
Time response specifications and analysis: Transient response analysis and design, Error analysis and design.
Control system stability analysis: Routh criterion and design, Root locus. Frequency Response Analysis and design: Polar plot "Nyquist diagram" Bode diagram – gain margin and phase margin . Nichols chart
Design and compensation: Reduction of parameter variations using feedback, Lead- Lag compensators, PID compensators – compensation design using Bode diagram and root locus. Stat Space Design and Analysis with Compensation: Pole placement design

LAB EXPERIMENTS

Using of MATLAB and SIMULINK to simulate, analyze and design control problems utilizing simple example as DC motors.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Describe the s-plane and recognize poles and zeros and understand the Contribution of individual poles and zeroes to stability.

A2 .Identify the effect of loop gain on the performance of closed- loop system with different control schemes.

A3. Define the transfer functions and describe the systems in terms of poles and zeroes.

A4. Recognize the basic time and frequency domain properties of feedback Systems and understand the application areas of automatic control.

Skills

B- Intellectual Skills:

B1. Derive transfer functions and state-space equations of system description.

B2. Show the response of step and other inputs from theory.

B3. Analyze the closed-loop systems from block diagram description and apply stability analysis techniques to dynamical systems.

B4. Design controllers from given specifications on robustness and performance

B5. Use bode-plot diagram to discuss relative stability.

B6. Design lead compensator to achieve specific phase margin and gain margin.

C- Subject Practical Skills:

C1. Apply MATLAB in simulation, analysis, and design of dynamical systems.

C2. Determine the response of dynamic systems to a variety of input signals.

C3. Analyze the characteristics of control system of first and second order.

C4. Evaluate controllers by analyzing transient and frequency via MATLAB.

D-Transferrable/Key Skills:

D1. Show ability for teamwork and collaboration at laboratory exercises.

D2. Acquire the ability to present and interpret projects.

D3. Show the ability to use automation and information technology.

D4. Develop the ability for critical thinking, reasoning and reflection.

Teaching/Learning Strategies

- Lectures
- Laboratories
- Tutorials
- Individual/ Group Project/ Term paper
- Team Projects/ Paper

Learning Materials

Useful Websites:

- http://www.engr.wisc.edu/

Reference Text:

- Kuo, B., Automatic Control Systems, 6th ed., Prentice Hall, latest edition. Supplementary Readings*:*
- Gata, K., Modern Control Engineering, 2nd ed., Prentice Hall, New Eddition.
- Doyle, J., B.A. Francis, and A.R. Tannenbaum, Feedback Control Theory, Macmillan Publishing Company, New Edition.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 456**
Title	**: Computer Architecture**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE362**

AIMS

This module is designed to enable students to understand concepts in computer organization and architecture. Register transfer Statements, and micro operations are studied. Design of arithmetic logic unit, central processing unit, input/output and memory interfaces are illustrated. Basic operating system concepts including Input/ Output management and memory management are also presented.

SYLLABUS

Topics
Review of Digital Logic Circuits
Register Transfer and Micro Operations
Basic Computer Organization and Design
Arithmetic Logic Unit
Hardwired Control Unit
Assemly Language of the Basic Computer
Micro programmed Control
Unit Central Processing Unit
Operating Systems
Input/Output Organization
Memory Organization

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Introduce the structure and function of computer modules.

A2. Understand the modern computer organization, architecture, and operating systems.

Skills

After completing this course students will be able to:

B. Intellectual Skills

B1. Utilize computer-based systems.

B2. Design and build computer-based systems.

C. Practical and Professional Skills:

C1. Student must be able to implement the concepts of the computer organization and architecture.

C2. Create and/or re-design a process, component or system, and carry out specialized computer systems designs

D. General and Transferable Skills:

D1. The student must acquire personal and interpersonal skills, including work as team member, develop his thinking.

D2. Work in stressful environment and within constraints and apply risk analysis.

D3. Communicate effectively.

D4. Demonstrate efficient IT capabilities

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Class
- Team projects / Term Paper.
- Presentations.

Learning Materials

Useful Websites

- http://www.bizrate.com
- http://www.dell.com

Reference Text:

- Mano, M., M., Computer System Architecture, Prentice Hall, 1993.
- , Supplementary Readings:
- IEEE computer magazine.
- William Stallings, Computer Organization and Architecture, 5th Edition, Prentice Hall, 2000.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. Exam).

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs / semester
• Total self-study hours	52.5	hrs / semester
• Total study hours	105	hrs / semester

Module Leader

Staff

400’s LEVEL MODULES

Second Semester

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 461**
Title	**: Computer Security**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE366 + CSE364**

AIMS

This module addresses the problem of securing computer systems. Different levels of computer threats and different authentication methods are studied. Ciphering and cryptographic techniques are studied to create secure algorithms. In addition, web security is introduced for the student to be aware of the different security techniques used at present.

SYLLABUS

Topics
Overview of Cryptography,
Mathematical Background, Number-Theoretic Reference Problems,
Public-Key Parameters,
Pseudorandom Bits and Sequences,
Stream Ciphers, Block Ciphers,
Public-Key Encryption,
Hash Functions and Data Integrity,
Identification and Entity Authentication,
Digital Signatures ·
Key Establishment Protocols,
Key Management Techniques ,
Web Security.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Appraise the different levels of computer threats.

A2. Differentiate between security, privacy and integrity.

A3. Characterize ciphering and cryptology.

A4. Illustrate the concepts of digital signature and Public or Private Key.

A5. Discriminate between different authentication methods used for access control in computer systems.

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Create digital signature and Public or Private Key.

B2. Propose, apply and evaluate security, privacy and integrity policies for a system.

C. Subject Practical Skills

C1. Apply key management techniques.
C2. Choose and implement the appropriate ciphering and cryptographic techniques.
C3. Implement different authentication methods.

D. Transferrable/Key Skills

D1. Communicate effectively.
D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Useful Websites:

- www.rfc.org
- http://www.alw.nih.gov/Security/security-www.html

Reference Text:

- Cryptography and Network Security, 4th ed , by William Stallings, Prentice Hall, 2007.

Supplementary Readings:

- Network and Internet security by Vijay Ahuja, Academic Press Ltd., 2004.
- Internet Security: Cryptographic Principles, Algorithms and Protocols, by Man Young Rhee, John Wiley and Sons, 2003.

Software Requirements

- VC++, Java

Assessment Scheme

- Weekly Written Assignment
- Class Written Tests
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam
- Unseen Written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	5%
• Tests and Quizzes	10%
• Projects and Reports	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2	hrs / week
• Laboratories	3	hrs / week
• Total class contact hours	75	hrs / semester
• Total self-study hours	75	hrs / semester
• Total study hours	150	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 462a**
Title	**: Fundamentals of Database Systems**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE 454**

AIMS

This module introduces the basic concepts in database system and its architecture. It discusses the different models and different levels of abstractions. Then it introduces the entity-relationship model as a conceptual modelling technique. The main subject of the module is the relational database model, languages and systems.

SYLLABUS

Topics
Databases and Database users
Database system concepts and architecture
Data modelling using the entity-relationship model
The relational data model, relational constraints, and the relational
Fundamentals of SQL.
The relational database standard ER and EER to relational mapping
Concepts for object – oriented databases

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Demonstrate the concepts of database management systems.

A2. Explain and appreciate the underlying theory, such as mathematics and logic, relevant to database design, development and evaluation.

A3. Illustrate the relational model using entity relationship diagram (ERD).

A4. Illustrate the elements and syntax of the SQL language and explain their use.

Skills

After completing this course students well be able to:

B. Intellectual Skills:

B1. Model business data using entity relationship diagram (ERD), transform it to the relational model and apply normalization and integrity rules to it.

C. Subject Practical Skills

C1. Utilize any implementation of the SQL language for data manipulation.

C2. Utilize an R-DBMS (e.g. ORACLE) to implement a relational database schema, a database application, and execute queries.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Computer Laboratories.
- Tutorials.
- Class Presentations.

Learning Materials

Reference Text:

- Fundamentals Of Database Systems, 7th ed. by Ramez Elmasri and Shamkant B. Navathe, Addison-Wesley Copyright: 2008.

Supplementary Readings:

- An Introduction to Database Systems, 8th ed. by C. J. Date, Addison-Wesley, 2008.
- Database System Concepts by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan McGraw-Hill- Aug 1, 2009.
- Database Systems: Design, Implementation, and Management 8th ed. by Peter Rob and Carlos Coronel, Course Technology, Dec 20, 2007.
- Oracle 10g Developer: PL/SQL Programming by Joan Casteel, Course Technology, Aug 15, 2007.
- Oracle Database 11g: The Complete Reference by Kevin Loney Osborne ORACLE Press Series, Dec 17, 2008.
- Oracle Developer Advanced Forms and Reports, by Peter Koletzke, Paul Dorsey, McGraw-Hill Osborne, 2007.

Software Requirements:

- Oracle Designer

Assessment Scheme

- Weekly Written Assignment
- Class Written Tests
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam
- Unseen Written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	5%
• Tests and Quizzes	10%
• Projects and Reports	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 4631**
Title	**: Cryptography**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE 451**

AIMS

The objective of this course is to provide a foundation of cryptography in an applied manner so that students can grasp its importance in relation to the field of information security. The course covers principles of number theory, cryptographic algorithms and cryptanalysis. Topics include: steganography, block and stream ciphers, secret key encryption (DES, AES, RC-n), primes, random numbers, factoring, and discrete logarithms; Public key encryption (RSA, Diffie-Hellman, Elliptic curve cryptography); Key management, hash functions (MD5, SHA-1,RIPEMD-160, HMAC), digital signatures, certificates and authentication protocols, and Cryptanalytic methods (known, chosen plaintext etc.) for secret and public key schemes.

SYLLABUS

Topics
Introduction; History of Cryptography; Steganography.
Cryptology and simple cryptosystems; Shift, Affine, Hill Ciphers; Enigma
Conventional encryption techniques; Stream and block ciphers; DES;
DES continued; Linear and Differential Cryptanalysis; Hash functions;
More on Block Ciphers; The Advanced Encryption Standard
Hash Functions and their Implementation
Number Theory and Algorithm Complexity; Public Key Encryption - RSA
Public key Encryption using Discrete Logarithms
Elliptic Curve Cryptography
Digital signatures and the digital signature standard
Key Management Schemes
Identification Schemes and Biometrics

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this course students well be able to:

A.1. Grasp the importance of cryptography in relation to the field of information security. A.2. Understand principles of number theory, cryptographic algorithms and cryptanalysis A.3. Learn how various cryptographic schemes work?

Skills

After completing this course students well be able to:

B. Intellectual Skills:

B.1.Measure the running time of an algorithm and understand the notion of reducing one problem to another.

B.2. Analyze security of a cryptographic scheme and determine whether o r not it is secure.

C. Subject Practical Skills

C1. Apply knowledge of mathematics, science, information technology

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

Learning Materials

Useful Websites

- http://www.engr.wisc.edu/

Reference Text:

- WILLIAM STALLINGS, Cryptography and Network Security, Sixth Edition, ISBN: 0133354695,

Supplementary Readings:

- Douglas R. Stinson, Cryptography: Theory and Practice, 3rd ed., Chapman and Hall/CRC, 2005
- William Stallings, Cryptography and Network Security, 4th.Ed, Prentice Hall PTR, 2006

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 4632**
Title	**: Human Computer Interaction**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE354**

AIMS

This module introduces the field of human computer interaction with emphasis on its impact on software design. It provides the student with theories and models of the way users think and work to guide the students to best design the interface to suite users' preferences. It provides an understanding of the underlying processes of human perception, information processing, and demonstrates their relevance to user interface design. Students will learn how to apply mechanisms such as feedback, user support, navigation aids and good screen design in constructing interface designs that match users' needs. Students will also learn techniques for evaluating user interface designs that are grounded in theory.

SYLLABUS

Topics
What is Interaction Design?
Understanding and Conceptualizing Interaction
Cognitive Aspects
Interfaces and Interactions
The Process of Interaction Design
Design, Prototyping and Construction
Design Evaluation: Usability Testing, Field Studies and Analytical Evaluation

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Differentiate between the different scientific fields involved in interaction design

A2. Illustrate the principles and the applications of ID design goals, usability goals, user experience etc.

A3. Analyse how much the theories of how people communicate and work can influence the design of interactive systems

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Select models that are appropriate to particular design problems and contexts and justify those choices.

B2. Apply standard usability evaluation techniques to evaluate and critique designs from a usability perspective, and to propose improvements

C. Subject Practical Skills

C1. Design interactive systems that are usable and meet the users' needs.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Essential

Interaction Design: Beyond Human-Computer Interaction, 3rd ed. by Helen Sharp, Yvonne Rogers, and Jenny Preece, Wiley June 07, 2011

Recommended

- Human-Computer Interaction 3rd ed. by Alan Dix, Janet E. Finlay, Gregory D. Abowd, and Russell Beale, Prentice Hall, Dec 20, 2003
- Designing Interactions by Bill Moggridge, The MIT Press, Oct 1, 2007
- About Face 3: The Essentials of Interaction Design, 3rd ed. by Alan Cooper, Robert
- Reimann, and David Cronin, Wiley, May 7, 2007
- Designing for Interaction: Creating Smart Applications and Clever Devices (VOICES)
- by Dan Saffer Peachpit Press, Jul 28, 2006
- The Design of Everyday Things by Donald A. Norman, Basic Books, Sep 17, 2002.

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF EGINEERING
MODULE OUTLINE

Module Code	**: CSE4633**
Title	**: Theory of Computing**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE354**

AIMS

This module is an introduction to Computer Science Theory. Topics covered include the basics of the Automata Theory and the Theory of Grammars, to design language definers, differentiate between different statements and different languages.

SYLLABUS

Topic
Introduction to Languages and Grammars.
Deterministic and Nondeterministic Finite Automata (DFA and NFA).
Equivalence between DFA and NFA.
Introduction to Regular Expressions.
Equivalence between Regular Expressions and NFA.
Closure Properties of Regular Languages.
Pumping Lemma and non-regular Languages.
Introduction to Context-free Grammars and Languages. Derivations Trees and Parsing.
Transforming Grammars. Chomsky and Greibach normal Forms.
Introduction to Nondeterministic Pushdown Automata (NPA). Equivalence between NPA and Context-free languages.
Introduction to Turing machines. Decidable Languages and Computable Functions. Church Thesis.
Nondeterministic Turing Machines. Universal Turing Machines.
Undecidability: The Halting Problem.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Demonstrate the elements of Automata Theory (Finite State, Pushdown and Turing machines)

A2. Characterize the limitation of each automata type

A3. Relate the theory of grammars to automata theory

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Evaluate the validity of a given statement in automata theory and prove or disprove them

B2. Differentiate between regular, context-free, decidable and undecidable languages

C. Subject Practical Skills

C1. Design different language definers (automata, grammars, regular expressions), as well as transform one into another.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Materials

- Lectures
- Tutorials
- Lab& Software practice
- Office Hours

Learning Materials

Essential

- Introduction to the Theory of Computation, Second Edition Michael Sipser, Course Technology, 2006.
- Introduction to Automata Theory, Languages, and Computation, 2nd edition.

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%

Learning Unit Contact Per Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

Staff

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MODULE OUTLINE

Module Code	**: CSE4634**
Title	: **Digital Image Processing**
Level	: **4**
Credit Hours	: **3**
Prerequisites	: **Min 108 credit hrs or Consents of Advisor**

AIMS

Thismoduleintroducesanunderstandingofimageprocessingtechniquesandfamiliarizes with computer vision applications Practical experience is acquired in the design and implementation of image processing algorithms.

SYLLABUS

Topics
Image sensing and acquisition
Image Sampling and Quantization
Basic Relationship between Pixels
Linear and Nonlinear Operations
Image Enhancement in Spatial Domain
Histogram Processing
Spatial Filtering (Smoothing, Sharpening)
Image Restoration
Image Compression Models
Edge detection
Morphological operations
Error-Free Compression
Loose Compression
Image Segmentation

LEARNINGOUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Conceptualize image processing problems.
A2. Demonstrate the image processing concepts.
A3. Illustrate the standard image processing algorithms.
A4. Compare/contrast the different applications of computer vision

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Illustrate and apply the concepts and method for the formation, representation, enhancement and analysis of digital images.

B2. Use available tools to develop applications of image processing.

C. Subject Practical Skills

C1. Improvise the design and implementation of image processing algorithms to suite specific applications.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline

Teaching/Learning Strategies

Weekly Lectures: The module consists of class lecture sessions and a laboratory component.

Weekly Lab: The lab component of the module consists of assignments and a small project that the students can do on their own time schedule.

For the project component of the image-processing course, every student is supposed to complete a small project.

The principal objectives of completing a project are:

- Students gain practical experience on how to manipulate images.
- Studentsdevelopasenseofhowimageprocessingsolutionsareprototypedin software.

For the project, students should use a programming language or a combination of a Programming language and MATLAB.

Learning Materials

Lecture notes

Essential

"Digital Image processing, Third edition",by R. Gonzalezand R.Woods,2007, Prentice Hall

Periodicals, Websites, etc

- IEEE Trans on Image Processing
- IEEE Trans on Medica l Imaging
- IEEE Trans on Pattern Analysis and Machine Intelligence
- IEEE Trans on Biomedical Engineering
- IEEE Trans on Information Technology in Biomedicine
- IEEE Trans on Signal Processing
- IEEE Trans.onVisualization and Computer Graphics
- Signal Processing, Image Communication (Elsevier Science)
- Signal Processing (Elsevier Science)
- Pattern Recognition,(Pergamon-Elsevier)
- Pattern Recognition Letters(Elsevier)
- Digital Image Processing websites.

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%

Learning Unit Contact Per Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 464a**
Title	**: Artificial Intelligence**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: CSE454**

AIMS

This module introduces students to the basic knowledge representation, problem solving, and learning methods of artificial intelligence. Upon completion of this module, students should be able to develop intelligent systems by assembling solutions to concrete computational problems, understand the role of knowledge representation, problem solving and learning in intelligent-system engineering, as well as in understanding human intelligence from a computational perspective.

SYLLABUS

Topics
Introduction to artificial intelligence and AI programming languages
Intelligent agents
Problem Solving and State space representation
Uninformed search techniques
Informed search techniques
Game playing
Propositional and predicate
Introduction to Learning
Introduction to Natural Language Processing

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Assess the applicability, strengths, and weaknesses of the basic knowledge representation, problem solving, and learning methods in solving particular engineering problems.

A2. Illustrate the fundamental concepts of search techniques and the difference between algorithmic solutions and heuristics.

A3. Discuss the importance of learning for intelligent systems.

Skills

After completing this course students well be able to:

B. Intellectual Skills:

B1. Derive abstract representations and formulate appropriate solutions for problems (4)

B2. Deploy logical, analytical, and problem solving skills and to synthesize solutions (5)

C. Subject Practical Skills

C1. Implement some search and game playing algorithms. (6)

C2. Build and query a knowledge base and develop simple AI applications.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Computer Laboratories.
- Tutorials.
- Class Presentations.

Learning Materials

Reference Text:

- Artificial Intelligence: A Modern Approach, 2nd edition, Stuart Russell and Peter Norvig, Prentice Hall, 2003.
- Artificial Intelligence, (Third Edition) by Patrick Henry Winston, 1993.

Supplementary Readings:

- Prolog Programming for Artificial Intelligence", Ivan Bratko, 3rd Edition, Addison- Wesley, 2000.

Software Requirements

- Prolog, Lisp or Java IDE.

Assessment Scheme

- Weekly Written Assignment (12 home Assignments).
- Class Written Tests (2 1.5-hr. Tests).
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam (2 1.5-hr. Tests).
- Unseen Written Final-Exam (3-hr. Exam).

Assessment Pattern

• Class Participation	5%
• Assignments	5%
• Tests and Quizzes	10%
• Projects and Reports	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs / semester
• Total self-study hours	52.5	hrs / semester
• Total study hours	105	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 465**
Title	**: Information Theory and Coding**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 365**

AIMS

This module is designed to enable students to focus on the analysis of the source coding, optimal codes, entropy**,** information channels, using an unreliable channel, error correcting codes, linear codes, and convolution codes.

SYLLABUS

Topics
Source Coding
Optimal Codes
Entropy
Information Channels
Using an Unreliable Channel
Error Correcting Codes
Linear Codes – Block Coding – Convolutional Coding – Turbo Codes

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Categorize the various codes, and compare between them.

A2. Illustrate different error correcting codes.

A3. Analyze and design different source and channel

Skills

After completing this course students will be able to:

B. Intellectual skills

B1. Analyse different source and channel codes

B2. Deduce useful codes

C. Subject Practical Skills

C1. Design different source and channel codes

C2. Apply the concept of Hamming distance and Shannon's theorem

D. Transferrable/Key Skills

D1. Conduct oral and written communication.

D2. Prepare Technical reports and representations.

D3. Engage in team working.

Teaching/Learning Strategies

- Lectures.
- Class Presentations
- Laboratories
- Tutorials
- Team Projects / Paper

Learning Materials

Useful Websites

- http://www.inference.phy.cam.ac.uk/mackway/info-theory/course.html

Reference Text:

- Jones, G., and Jones, M., Information and Coding Theory, Springer,2000

Supplementary Readings:

- IEEE Information Theory Magazine
- Simon Haykin, Communication Systems, John Wiley and Sons, 2001

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2.5	hrs / week
• Tutorials	1	hrs / week
• Total class contact hours	52.5	hrs / semester
• Total self-study hours	52.5	hrs / semester
• Total study hours	105	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code: **ECE466**
Title **: Digital Signal processing**
Level **: 4**
Credit Hours: **3**
Prerequisites: **ECE 365**

AIMS

This module is designed to provide students with the mathematical tools and intuition for processing digital signals in the time, frequency and z domains. Students will learn how to filter, modify, analyze, and extract information from digital signals.

SYLLABUS

Topics
Signals and Systems, and Representation of Signals in Time Domain
Linear, Time-Invariant Systems, Impulse Response and Convolution Sum
Linear Constant-Coefficient Difference Equation, Fourier Transform and Frequency Response
Z-Transform and Inverse Z- Transform and its properties
More about Properties of z-transform and inverse z-transform
Discrete Fourier Transform (DFT)
Signal Analysis and Synthesis based on DFT
Fundamental Structures of Digital Filters
Internal Representation of LTIS systems
Digital Filter Design

EARNING OUTCOMES

A. Knowledge and understanding

After completing this course students will be able to:

A1. Recognize signals and systems.
A1. Understand signal representation in time, frequency and z domains. A1. Understand Discrete Fourier Transform (DFT).
A1. Identify the fundamental structures of digital filters.
A1. Understand the internal representation of LTIS systems.

B. Intellectual skills

After completing this course students will be able to:

B1. Extract information from digital signals
B2. Analyse signals and syatems in time, frequency and z domains.
B3. Apply z-transform properties and theorems to digital signals.
B4. Analyse signals based on DFT.
B5. Design digital filters to meet specific filtering criteria.

C. Subject practical skills

After completing this course students will be able to:

C1. Use the mathematical tools with digital signals.
C2. Construct digital filters to meet specific filtering criteria.
C3. Develop the design of digital filters to improve their response. C4. Synthesize signals based on DFT.

D. Transferable/key skills

After completing this course students will be able to:

D1. Conduct oral and written communication.
D 2. Prepare Technical reports and representations. D 3. Engage in team working.

Teaching/Learning Strategies

- Lectures.
- Laboratories.
- Tutorials.
- Team Projects / Term

Learning Materials

Software

MATLAB

Useful Websites

- http://www.web-ee.com

Reference Text:

- Li Tan, and Jean Jiang, *Digital Signal Processing: Fundamentals and Applications*, 2nd edition, Elsevier, 2008.

Supplementary Readings:

- IEEE Circuits and Systems Magazine
- V. K. Ingle, and J. G. Proakis, *Digital Signal Processing using MATLAB*, Brooks/Cole, 2nd edition, 2007.

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2	hrs / week
• Laboratories	3	hrs / week
• Total class contact hours	75	hrs / semester
• Total self-study hours	75	hrs / semester
• Total study hours	150	hrs / semester

Module Leader

Staff

500’s LEVEL MODULES

First Semester

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code: **ESE 551**
Title : **Electrical Energy Conversion**
Level : **5**
Credit Hours: **3**
Prerequisites : **ECE455**

AIMS

This module is designed to enable students understand the concept of energy conversion, structure and function of power stations, and environmental effects of energy resources. In addition, the principles of magnetic circuits, excitation in single phase transformer, voltage regulation, losses and efficiency, auto-transformation are introduced. It also presents the principles of electromechanical energy conversion, DC generators, DC motors, three phase transformers, polarity, and standard terminal marking, parallel operation, and all-day efficiency. It also addresses the principles of AC machines, Synchronous machine, electro motive force (emf) equivalent circuit, power equation, and distribution of electric power.

SYLLABUS

Topics
Electrical Energy Conversion
Types of Power Stations
Principle of Magnetic Circuits
Single Phase Transformer
Electromechanical Energy Conversion
Principles of DC Machines:
Three Phase Transformer
Principles of AC Machines
Distribution of Electric Power
Environmental Effects of Energy Resources

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Understand both Direct Current and Alternating Current machines including D.C. Motors, Generators, and Induction Motors A.C.

A2. Comprehend the structure and function of Alternators, Transformers, and Power Stations.

A3. Recognize the principles of high voltages and high currents.

Skills

After completing this module, students will be able to:

B. Intellectual Skills:

B1. Experiment the basic Electromechanical Energy Conversion devices.

B2. Analyze the difference between both direct and AC power station.

C. Subject Practical Skills:

C1. Analyze the performance of electrical motors and transformers.
C2. Analyze the performance of DC motors and AC motors.
C3. Analyze the performance of DC and AC sources.

D. Transferrable Skills:

D1. Solve problems in high power sources
D2. Develop the critical thinking
D3. Writing technical report.
D4. Develop the time management.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Team Projects/ Paper
- Laboratories
- Class Presentations

Learning Materials

Reference Text:

- P.C.Sen "Principles of Electric Machines and Power Electronics "2nd edition, 2003.
- B.T. Theraja "A Text Book of Electrical Technology" New Delhi, 1989.
- Vincent del Toro "Electromechanical Devices for Energy Conversion and Control System" new edition International edition, Prentice-Hall Inc.C

Software Requirements:

- MATLAB

Supplementary Readings:

- IEEE Magazine

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

●Class Participation/Assignments	20%
●Tests and Quizzes	20%
●Unseen Mid-Term Exam	20%
●Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader

Staff

MSAUNIVERSITY

FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 552**
Title	**: Mobile Communication Systems**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 365**

AIMS

This module is designed to introduce students to wireless personal communications, one of the fastest growing fields in the engineering world. Technical concepts which are at core of design, implementation, research, and history of wireless communication systems are presented followed by current and evolving wireless communication systems and standards.

SYLLABUS

Topics
Introduction to wireless communication systems
Modern wireless communication systems
Second Generation (2G)Cellular Networks
Third Generation (3G)Wireless Networks
The Cellular Concept—System Design Fundamentals
Frequency Reuse
Channel Assignments Strategies
Handoff Strategies
Interference and system Capacity
Trunking and Grade of service
Improving Coverage and Capacity in Cellular Systems
Mobile Radio Propagation: Large-Scale Path Loss
Mobile Radio Propagation: Small-Scale Fading and Multipath
Wireless Systems and Standards

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Explain technical aspects, and operations

A2. Compare different generations of cellular mobile and personal communication technologies.

A3. Differentiate among wireless communication systems and their standards.

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B.1.Compare different generations of cellular systems

B.2.Solve problems encountering design and capacity improvement

B.3.Analyze a cellular system performance

B.4.Discuss and explain the operation of wireless mobile Radio Channel

C. Subject Practical Skills

C1. Apply knowledge of mathematics, science, information technology

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline

Teaching/Learning Strategies

- Lectures
- Tutorials
- Individual/Group Project
- Laboratories

Learning Materials

Useful Websites

- Http://www.engr.wisc.edu/

Reference Text:

- A. F. Molisch, Wireless Communications, Second edition, 2011, John Wiley

Supplementary Readings:

- T. S. Rappaport, Wireless Communications Principles and Practice, Prentice Hall
- D. Gibson,Jerry,TheMobile Communications Handbook, CRC Press.
- Lee,W.C.Y. Mobile Cellular Telecommunications, McGraw Hill.
- Proakis,John, Digital Communications, McGraw Hill.
- Lathi, B.P.,Modern Digital and Analog Communication Systems, Oxford Press,1998.
- Stuber,G.L.,Principles of Mobile Communication, Kluwer Academic Publishers,1996.
- Garg,V.K. and J.E. Wilkes, Wireless and Personal Communication Systems, PrenticeHall, 1996.

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per week

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF EGINEERING
MODULE OUTLINE

Module Code	**: CSE5531**
Title	**: Web Programming**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: CSE451**

AIMS

This is a core module for web programming. The student will learn the client-side aspect of web programming. The topics will cover different client-based techniques and their applications in real world. Emphasis will be made on Mark up and Scripting languages and their use in web applications.

SYLLABUS

Topics
Extensible Mark-up Languages such as HTML5 and XML
Cascading Style Sheets (CSS3)
Client-side scripting languages such as JavaScript
Server-side scripting language such as ASP.NET
Document Object Model (DOM)
Using XML and the DOM
The use of scripting languages libraries such as J Query
Creating a full Rich Internet Application (RIA)

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Understand web technologies programming languages.

A2. Recognize client-side scripting tools and techniques

A3. Understand web applications using the new frameworks such as Asynchronous JavaScript and XML-Ajax

A4. Identify Rich Internet Applications.

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Assess the use of Mark-up languages in building web pages.

B2. Analyze interactive web pages using scripting language such as JavaScript.

B3. Access using Document Object Model methods

C. Subject Practical Skills

C1. Evaluate web techniques such as Ajax in development of web applications.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Lab/Software practice
- Office Hours

Learning Materials

Reference Text

- Deitel, Paul (2012) Internet and World Wide Web: How to Programme, 5th edition, Prentice Hall.

Useful websites

- http://www.w3schools.com/
- http://tutorialspoint.com/

Assessment Scheme

- Assignments
- Class/Lab written Tests/Quizzes.
- Unseen written Mid-Term Exam (1.5-hr. Exam)
- Unseen written Final-Exam (3-hr. Exam)

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per week

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
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MODULE OUTLINE

Module Code	: **CSE5532**
Title	: **Advanced Database Systems**
Level	: **5**
Credit Hours	: **3**
Prerequisites	: **CSE**462

AIMS

This module expands the principals of database management systems introduced in the prerequisite module to provide more advanced topics that cover a broad range of concepts, modeling, and system implementation techniques. The focus will be: on illustrating how issues such as database catalogue, query processing, transaction processing, security, concurrency controls are implemented in real database management systems, and on emerging technologies such as object-oriented database models and system implementation techniques.

LEARNING OUTCOMES

Topics
Advanced topics in SQL
Examples of Relational Database Management Systems: Oracle
Database System Architecture and the System Catalogue
Query Processing and Optimization
Transaction Processing Concepts
Concurrency control
Recovery
Database Security and Authorization
Concepts for Object-Oriented Database Systems
Overview of the Object Model of ODMG and the Object Definition Language (ODL)
The Object Query Language (OQL)
Object Relational and Extended Relational Database Systems
Emerging Database Technologies and Applications

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Critically appreciate the advanced concepts of database management system
A2. Appraise the object orient database models.
A3. Demonstrate the techniques of implementing transaction processing in a database environment.
A4. Critically analyze the important issues and techniques of database security

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Evaluate the suitability of object oriented data models for a given application.
B2. Compare, evaluate and setting up the real RDBMSs.

C. Subject Practical Skills

C1. Apply advanced techniques such as query optimization and

transaction processing in database applications.

C2. Manage database security, authentication and authorization

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Lab/Software practice
- Office Hours

Learning Materials

Reference Text

- Fundamentals Of Database Systems, 6th ed. by Ramez Elmasri and Shamkant B. Navathe, Addison-Wesley Copyright: 2011.

Recommended Readings

- An Introduction to Database Systems, 8th ed. by C. J. Date, Addison- Wesley, 2009.
- Database System Concepts by Abraham Silberschatz, Henry F. Korth, and S. Sudarshan McGraw-Hill- Aug 1, 2007.
- Database Systems: Design, Implementation, and Management by Peter Rob and Carlos Coronel, Course Technology, 2008.

Assessment Scheme

- Assignments
- Class/Lab written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per week

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF EGINEERING
MODULE OUTLINE

Module Code	**: CSE 5533**
Title	**: Speech Signal Processing**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: CSE464**

AIMS

This module is designed to enable senior students to understand the speech signal processing problems, and follow the motivation for nearly all commonly-used speech processing methods. The treatment of speech signal processing requires an initial grounding in digital signal processing. This enables students to understand why things appear the way they do in various spectrographic representations, and also allows a proper coverage of basic speech processing algorithms such as linear prediction and cepstral analysis. The actual speech processing algorithms to be covered are not prescribed. Where possible, students should have access to a software environment which allows interactive investigation of the basic algorithms.

SYLLABUS

Topics
Signal processing tools: Digital filters, Fourier series and transforms, DFT, FFT, Short-Term Fourier Transform (STFT), Filter banks
Speech acquisition and digitisation
Speech analysis and parameter extraction : Short-term analysis, frames and windows, Time-domain analysis: energy, zero-crossings, statistic parameters, autocorrelation, Frequency-domain analysis: spectra and spectrograms, Cepstral analysis, Linear prediction analysis, Pitch and formant estimation, Static and dynamic features
Speech signal synthesis
Speech coding
Speech enhancement
Signal processing tools

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Define models of speech.

A2. Comprehend speech processing operations.

A3. Recognise the speech compression techniques such as G.729.

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1. Perform various analytical procedures for processing speech signals.

B2. Apply knowledge of general digital signal processing techniques on speech signals.

B3. Evaluate various speech compression techniques.

C. Subject Practical Skills

C1. Utilize software tools, e.g. MATLAB, to solve speech processing problems.

C2. Practice with specialized hardware and software packages to handle speech signals such as Adobe Audition.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Useful Websites

- http://www.utexas.edu/its/windows/database
- http://www.theparticle.com

Reference Text:

- Owens, F.J. (1993), Signal Processing of Speech, Macmillan.
- Deller, J.R., Proakis, J.G., and Hanson, J.H. (1993), Discrete-Time Processing of Speech Signals, Macmillan.

Supplementary Readings:

- IEEE Computer Magazine.

Assessment Scheme

- Weekly Written Assignment
- Class Written Tests
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

●Class Participation	10%
●Assignments	10%
●Tests and Quizzes	10%
●Projects and Reports	10%
●Unseen Mid-Term Exam	20%
●Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 5534**
Title	**: Special Topics in Electronics**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: Min 108 credit hrs or Consents of Advisor**

AIMS

This module is designed to enable students to cope up with new advances in research in electronics.

SYLLABUS

Topics
Review of Electronics available today
Advances in Electronics research.
Concentration on a specific research topic in Electronics.

Learning Outcomes

A. Knowledge and Understanding

After completing this module, engineering students will be able to:

A1. Characteristics of engineering materials used in electronic circuits and components.

A2. Technical language and research writing.

A3. Methodologies of solving engineering problems, data collection and interpretation.

A4. Advanced and new trends of Communication and Electronic systems and networks.

Skills

After completing this course students well be able to:

B. Intellectual skills:

B1. Select appropriate mathematical and computer-based methods for solving electronics and communication systems problems

B2. Assess and evaluate the characteristics and performance of electronic components, systems and processes.

B3. Investigate and troubleshoot the failure of electronic components, systems, and processes.

C. Subject practical skills:

C1. Use the standard tools to maintain and repair almost all types of electronic systems.

C2. Synthesize and integrate electronic systems for certain specific function using the right equipment.

D. Transferable/Key skills:

D1. Search for information and engage in life-long self-learning discipline.

D2. Acquire entrepreneurial skills.

D3. Prepare and present technical reports.

Teaching/Learning Strategies

- Orientation Sessions.
- Review and discussion Sessions.
- Team projects.
- Presentations

Learning Materials

Reference Text:

- Will be provided by instructor if needed.

Supplementary Reading:

- Scientific Papers.
- Research Reports

Assessment Scheme

- Weekly Lectures.
- Mid- Written and Final written reports.
- Mid and Final oral presentations.

Assessment Pattern

• Course work	40%
• Mid Term Exam	20%
• Final Exam	40 %
Total	**100%**

Leaning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	: **HUM 5535**
Title	: **Entrepreneurshipand Small Business Management**
Level	: **5**
Credit Hours	: **3**
Prerequisites	: **Min 108 credit hrs or Consents of Advisor**

AIMS

This module is designed to introduce the positive relationship between economic growth and entrepreneurship, teach students the global growing trend of entrepreneurial activities for practical faculties. It is designed to be fully compatible across the global market; cope with the Egyptian government's prevailing strategies by advocating the entrepreneurial activities and supporting young people to start their own business and establishing rules and regulations which facilitate initiating these small businesses

SYLLABUS

Topics
An Introduction to the Foundations of Entrepreneurship: the main entrepreneurial characteristics and essential needed skills
Designing a Competitive Business Model and Building a Solid Strategic Plan
Conducting a Feasibility Analysis
The Establishment of a Retail or a Small Business Venture
The managerial functions for a retail or a small business venture: planning, organizing, directing, and contracting.
The business plan for an entrepreneurial venture.
The Legal Implications and Intellectual Property rights of a small Business Venture

Intended Learning Outcomes (ILOs)

A. Knowledge and Understanding

After completing this module, students will be able to:

A1- Comprehend the knowledge of the Foundations of Entrepreneurship.
A2- Understand the business/enterprise functions (production / operation, purchasing, marketing, financing, personnel management ….etc).
A3- Understand the legal and intellectual property implications of a small business venture

B. Intellectual Skills.

After completing this module, students will be able to:

B1- Assess the feasibility of a business venture by conducting a market research.
B2- Identify how to establish a retail business or a small business venture.

C. Professional and Practical Skills

After completing this module, students will be able to:

C1- Illustrate how to apply the managerial functions: planning, organizing, directing, and contracting.

C2- Develop a business plan for an entrepreneurial venture.

D. General and Transferable Skills

After completing this module, students will be able to:

D1- Developpersonal expression and creativity.

D2- Demonstrate the ability to work effectively as part of a team.

D3- Develop presentation Skills.

Teaching/Learning Strategies

- Lectures.
- Research Projects/ Business Plan.
- Field Trips.
- Tutorials.
- Case study.
- Guest Speakers.

Learning Materials

Software Requirements:

- Non.

Video / Slides:

- A video of a case study ranging from 5-10 minutes.

Useful Websites:

- **http://search.ebscohost.com/login.aspx?direct=trueanddb=e020mwwandAN=324630andsite=ehost-live**

Reference Text:

- Allen, K., Entrepreneurship for Scientists and Engineers, 2009, Pearson Prentiss Hall
- Norman, M., Essentials of entrepreneurship and Small Business Management, 2013, 7th edt., Pearson Prentiss Hall

Supplementary Readings:

- Osterwalder, A. and Pigneur, Y., Business Model Generation, 2010, Hoboken, NJ
- Schoar, Antoinette and Lerner, Joshua, International Differences in Entrepreneurship, 2010, University of Chicago Press.
- Timmons, J. A. and Spinelli, S., New Venture Creation: entrepreneurship for the 21st century, 2009, McGraw-Hill

Assessment Scheme

- Research Project/Business Plan.
- Case study.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Research Project/Business Plan.	20 %
• Case study	20 %
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100 %**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSAUNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	: **CSE 554**
Title	: **Graduation Project (Part I)**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: Min. Credits 138 and Min. Cum. GPA 2**

AIMS

This module is designed to enable senior students to perform appropriate research, and apply relevant engineering standards to develop a solution of a problem, or a design of a system. Students may suggest their own projects, or receiving proposals from supervisors or company sponsor.

SYLLABUS

Topics
Define the problem.
Develop a research plan.
Conduct background research.
Evaluate different options of problem solutions
Decide and Justify a specific solution
Prepare mid-term oral Presentations.
Submit mid-term written Reports
Prepare final oral Presentations.
Submit final written Reports

Learning Outcomes

A. Knowledge and Understanding

After completing this module, engineering students will be able to:

A1. Recommend research methods and techniques to contribute to a solution of an engineering problem.

A2. Determine how to deal with real - life engineering, industrial or service system.

Skills

After completing this module, engineering students will be able to:

B- Intellectual Skills:

B1. Recognize the needs for any company.

B2. Construct appropriate scientific research, and apply relevant engineering standards to develop formal requirements for the solution of a problem or the design of a system.

B3. Compare alternative approaches and designs, on the basis of engineering principles to meet these requirements.

B4. Develop a method to Implement and operate the designated model or the prototype.

C- Subject Practical Skills:

C1. Evaluate the results against the requirements, using performance measures

C2. Combine a variety of research documents including professional

communications letters and sketches in a student portfolio.

C3. Develop collaboratively appropriate written reports, taking into Consideration the format and citation.

C4. Perform oral presentations for supervisors and senior students during several Seminars.

D- Transferrable/Key Skills:

D1. Demonstrate effective time management.

D2. Develop their skills for an effective and focused involvement while working with teams work effectively with others in a team.

D3. Demonstrate and communicate their ideas effectively.

Teaching/Learning Strategies

- Orientation Sessions.
- Review and discussion Sessions.
- Team projects.
- Presentations.
- Field trips.

Learning Materials

Software Requirements

- Suitable software packages and/or.
- Building own codes.

Reference Text:

- Suitable textbooks and scientific journals in the field of the project.

Supplementary Reading:

- Scientific Papers.
- Research Reports
- Engineering Manuals.
- Technical Catalogues.

Assessment Scheme

- Weekly contacts with supervisor.
- Mid- Written and Final written reports.
- Mid and Final oral presentations.

Assessment Pattern

• Supervisor Evaluation	40%
• Mid Term Evaluation	20%
• Examiners' Staff Evaluation	40%
Total	**100 %**

Leaning Unit Contact Hours

• Sessions Laboratory	9	hrs / week
• Total class contact hours	135	hrs / semester
• Total self-study hours	135	hrs / semester
• Total study hours	270	hrs / semester

Module Leader

Staff

500’s LEVEL MODULES

Second Semester

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	: **ECE 561**
Title	: **VLSI Design**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 363, ECE 264**

AIMS

This module is designed to provide students with an in depth coverage of the design of VLSI digital circuits. Design both combinational and sequential circuits using CMOS - VHDL language are introduced. In addition, Design of digital systems using FPGA is also presented.

SYLLABUS

Topics
Introduction to CMOS Circuits: CMOS transistor theory - CMOS process - MOS layout- characterization - dynamic logic
FPGA hardware structures: Design and analysis of algorithm-specific VLSI processor –architectures - topics include the implementation of pipelined and systolic processor structure - techniques for mapping numerical algorithms onto custom processor arrays, including application specific instruction processors (ASIPs)
Prototyping using Xilinx ISE and Xilinx FPGAs. high-level DSP algorithm simulation and code generation- Languages for VLSI synthesis: VHDL, Verilog, SystemC.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Understand the digital VLSI design

A2. Understand the different methods of VLSI design

A3. Understand the concept of hierarchical design that VLSI systems are based on

A4. Realize how to use CAD tools to simulate a process.

A5. Realize how to use CAD tools to implement FPGA-based VLSI system

Skills

After completing this course students will be able to:

B. Intellectual skills:

B1. Analyze basic principles of designing a VLSI system using FPGA and CMOS technology.

B2. Simulate the design of logic operations using CAD tools

B3. Design different combinational and sequential circuits using VHDL

B4. Design FPGA/CMOS based VLSI applications.

C. Subject practical skills:

C1Implement mixed combinational and sequential VLSI circuits.

C2. Construct hierarchical VLSI systems
C3. Enhance the VLSI system performance
C4. Minimize the power consumption

D. Transferable/Key skills:

D1. Show ability for teamwork and collaboration at laboratory exercise.
D2. Acquire Personal and interpersonal skills, including work as a team member
D3. Show the ability to present and interpret projects
D4. Improve the ability to manage time and resources within an individual and group project

Teaching/Learning Strategies

- Lectures.
- Laboratories.
- Team projects.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Useful Websites

- http://www.ece.umd.edu
- http://www.seas.upenn.edu

Reference Text:

- Weste, N., Eshraghian, K., Principles of CMOS VLSI Design, John Wiley Inc.,2000.

Supplementary Readings:

- IEEE consumer electronics magazine.

Rabaey, Jan M., Anantha Chandrakasan and Vorivoje Nikollic, Digital Integrated Circuits, 2E Prentice Hall, 2003.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	2	hrs / week
• Tutorials	1	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	67.5	hrs / semester
• Total self-study hours	67.5	hrs / semester
• Total study hours	135	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Lu Code	: **HUM 562**
Title	**: Ethics, Safety and Health**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: None**

AIMS

This module is designed to provide the principles of engineering ethics, as professional ethics, opposed to personal morality. It sets the standards for professional practice to help students deal with issues they would face in their professional practice. It provides students with how serious and frequent hazards arise, how to assess the risks involved, and how to eliminate or control these risks. Theories of self-protective behavior and accident prevention are studied. Safety program effectiveness is analyzed. Methods of risk assessment and reduction is discussed. Advanced hazard communication is provided. Students will analyse variety of Case Studies.

SYLLABUS

Topics
Lab Safety and Health Movement: an Overview.
Ethical Guidelines in Engineering Work.
Scope of Engineering Ethics.
Case studies in Engineering Ethics.
Ethical Guidelines in Research.
Different codes of Ethics: an Overview.
Managing Health and Safety.
Industrial Hygiene.
Five Steps to Risk Assessment.
How Most Accidents and Cases of Work-related Ill Health Arise.
Working in and Moving Around the Workshop.
Ergonomic Hazards.
Standards for the Best Certified Work Place Conditions.
Instant Check Lists.

LEARNING OUTCOMES

A- Knowledge and Understanding

After completing this module, students will be able to:

A1- Understand the nature of professional responsibility and be able to identify the ethical elements in decisions.

A2- Interpret legislative requirements, industry standards, and best practices in a variety of workplaces.

A3- Identify constraints, uncertainties, and risk of the system.

A4- Acquire the fundamental knowledge on workplace ergonomics; and workplace, as well as, workstation design.

Skills

B- Intellectual Skills

B1- Address and resolve problems arising from questionable practice.

B2- Develop critical thinking skills and professional judgement, and understand practical difficulties of bringing about change.

B3- Design, support, and evaluate health and safety programs, and implement procedures appropriate to the work.

B4- Develop and analyze the occupational ergonomics issues, and develop solutions to control occupational ergonomics hazards.

C- Professional and practical skills:

After completing this module, students will be able to:

C1- Practice due diligence and employ ethical standards in all aspects of professional conduct.

C2- Apply monitoring programs for a case study (biological, chemical, physical, workplace hazards), to control and mitigate the impact of occupational hazards.

C3- Apply systems thinking to understand complex system behavior, including interactions between components and with other systems.

C4- Apply decision-making methodologies to evaluate solutions for efficiency, effectiveness, and sustainability.

D- General and Transferable skills:

After completing this module, students will be able to:

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

D3- Manage own time and processes effectively.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Field Trips

Learning Materials

Software and Computer Usage:

- None

Useful Websites:

- http://temp.onlinethics.org/cases/robot/article- 1.htm.
- chemlabs.uoregon.edu/Safety/GeneralInstructions.htm.
- *www.batesville.k12.in.us/physics/phynet/**lab**%20**rules/lab_rules**.html.*

Reference Text:

- Health and safety in engineering workshops (ISBN 978 0 7176 1717 3), Reprinted 2004 and 2010 (free download).

Supplementary Readings:

- Spellman, F.R. and N.E. Whiting, Safety Engineering: Principles and Practices, Government Institutes, Division of ABS Group Inc., Rockwell,Maryland, 1999.
- Davis, Michael, "The Moral Authority of a Professional Code," NOMOS29 (1987), pp. 302-337.
- Pritchard, M.S., "Ethics in Engineering: Good Works." NSF Grant No. SBR-9320257.

Assessment Scheme

- Weekly Assignments
- Tests

Assessment Pattern

• Homework Assignments	10%
• Tests and Quizzes	10%
• In-Class Mini Project	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	3	hrs / week
• Total class contact hours	45	hrs / semester
• Total self-study hours	45	hrs / semester
• Total study hours	90	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 5631**
Title	**: Spread Spectrum Techniques**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: Min 108 credit hrs or Consents of Advisor**

AIMS

This module is designed to provide students with the necessary knowledge about Direct sequence Code division multiple access (DS-CDMA), Mulitcarrier techniques: Orthogonal Frequency division multiple access (OFDM) and Multicarrier CDMA (MC-CDMA), Miscellaneous Current and New Technologies: Wideband CDMA (W-CDMA), Ultra Wideband (UWB) communications, Wireless Fidelity (Wi-Fi), and Radio Frequency Identification (RFID).

SYLLABUS

Topics
Multiple Access and Wi-Fi Signals (CDMA and OFDM)
Wireless Channel, Spread Spectrum and Random Variable
Direct Sequence and Spreading Codes
Synchronous CDMA
Asynchronous CDMA
Rake Receiver, Capacity Analysis and Power Control
Orthogonal Frequency Division Multiplexing (OFDM) Basics
Multipath Effects on OFDM
Fading and MC-CDMA
Channel Estimation
Intercarrier Interference
Ultra Wideband (UWB) and Others

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Describe the basic principles of CDMA and OFDM systems

A2. Recognize practical limits on CDMA and OFDM

Skills

After completing this course students well be able to:

B. Intellectual Skills:

B.1. Perform analysis of CDMA andOFDM systems

B.2. Design CDMA andOFDM systems and protocols

C. Subject Practical Skills

C1. Apply knowledge of mathematics, science, information technology.

C2. Hands on real CDMA andOFDM systems and protocols

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group

Learning Materials

Useful Websites

- http://www.engr.wisc.edu/

Reference Text:

- Don Torrieri , " Principles of Spread-Spectrum Communication Systems ", Springer;1st ed., 2004.

Supplementary Readings:

- Ipatov, Valeri P. , " Spread Spectrum and CDMA: Principles and Applications ", Wiley; 1st ed.

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam
- Unseen written Final-Exam

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Ubit Contact Hour Per Week

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 5632**
Title	**: Neural Networks**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: CSE464**

AIMS

Neural Networks is an advanced level course suited for Computer Science and Engineering students. It is primarily intended for students who are interested in doing research in the areas of Neural Networks and Computer Vision.

SYLLABUS

Topic
Introduction (Chapter 1)
Neuron Model and Network Architectures (Chapter 2)
An Illustrative Example (Chapter 3)
Perceptron Learning Rule (Chapter 4)
Background on Linear Algebra (Chapters 5 and 6)
Supervised Hebbian Learning (Chapter 7)
Background on performance surfaces and optimization (Chapters 8 and
Widrow-Hoff Learning (Chapter 10)
Backpropagation (Chapters 11 and 12)
Associative Learning (Chapter 13)
Competitive Networks (Chapter 14)

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Demonstrate an understanding of the Neuron Model and Network Architectures. (1, 2, 3)

A2. Illustrate the importance of the Perceptron Learning Rule. (4)

A3. Demonstrate an understanding of the Supervised Hebbian Learning. (6)

A4. Demonstrate an understanding of the Widrow-Hoff Learning. (8)

A5. Illustrate the importance of the Back propagation. (9)

A6. Demonstrate an understanding of the Associative Learning. (10)

A7. Demonstrate an understanding of the Competitive Networks. (11)

Skills

After completing this course students will be able to:

B. Intellectual Skills

B1. Examine different forms of learning (supervised, unsupervised and reinforcement Learning).

B2. Apply the basic neural network architectures and learning for image processing.

C. Practical and Professional Skills

C1. Master the basic neural network architectures and learning for pattern recognition.

C2. Master the basic neural network architectures and learning for computer vision.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

Weekly lectures will be used to formally introduce the topics of the syllabus and to achieve the learning outcomes but their full understanding is derived from explanation in the lectures combined with recommended readings.

Weekly laboratory sessions will be used to apply the processor design concepts learned in the lectures in order to gain the skills stated in the learning outcomes. Hardware-design software packages are to design, simulate and test the basic internal modules of a generic processor.

Learning Materials

Reference Text

M. Hagan, H. Demuth and M. Beale,*Neural Network Design*, PWS Publishing Company,1996.

Recommended Readings

- **S. Haykin**, *Neural Networks: A Comprehensive Foundation* 2nd edition, (Prentice Hall, 1999)
- **K. Mehrotra, C. Mohan, and S. Ranka**, *Elements of Artificial Neural Networks*, MIT Press, 1997.
- **C. Looney**, *Pattern Recognition Using Neural Networks*, Oxford University Press, 1997
- **C. Bishop,** *Neural Networks for Pattern Recognition*, Oxford University Press, 1995.
- **J. Hertz, A. Krogh, R.G. Palmer**, Introduction *to the Theory of NeuralComputation* (Addison-Wesley, 1991)

Assessment Scheme

- Assignments
- Class written Tests/Quizzes.
- Unseen written Mid-Term Exam (1.5-hr. Exam)

- Unseen written Final-Exam (3-hr. Exam)

Assessment Pattern

• Class Participation/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Ubit Contact Hour Per Week

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: CSE 5633**
Title	**: Compiler Design**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: CSE451**

AIMS

This module provides the detailed theories, principles and practices of the design of compilers. Internals of the process of compilation together with the detailed structure and components of compilers are studied, to transform a programming language syntax-specification to a design of a compiler. The essential parts of a compiler (or interpreter), for a current programming language, are implemented in lab.

SYLLABUS

Topics
Lexical Analyzer.
Context-Free Grammars.
Top-Down Parsing.
Bottom-Up Parsing.
Semantic Analysis.
Runtime Environments.
Code Generation.
Lexical Analyzer.
Context-Free Grammars.
Top-Down Parsing.

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Demonstrate the internals of the proces of compilation.

A2. Explain in detail the structure and components of compilers and implementation of compiler functions.

A3. Demonstrate and professionally apply techniques of code generation.

A4. Critically appraise the operation and performance of a compiler.

Skills

After completing this course students well be able to:

B. Intellectual Skills:

B1. Manipulate the process of transforming a programming language syntax-specification to a design of a compiler.

C. Subject Practical Skills

C1. Implement the main compiler or interpreter functions such as parsing, lexical analysis, code generation and optimization.

C2. Implement algorithms for optimizing code generation and a new programming language.

C3. Critically evaluate the performance of a compiler and improve its design.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Reference Text:

- Compiler Construction-Principles and Practice, by Kenneth C. Louden, PWS Publishing Company, 1997.

Supplementary Readings:

- Compiler Design by Reinhard Wilhelm and Dieter Maurer, Addison-Wesley, 1995.
- Advanced Compiler Design and Implementation, Steven S. Muchnick, Morgan Kaufmann Publishers, 1997.
- Optimizing Compilers for Modern Architectures, Randy Allen and Ken Kennedy, Morgan Kaufmann Publishers, 2001.

Software Requirements

- **Visual C++.**

Assessment Scheme

- Weekly Written Assignment
- Class Written Tests
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam
- Unseen Written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	10%
• Tests and Quizzes	15%
• Projects and Reports	10%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF EGINEERING
MODULE OUTLINE

Module Code	: **CSE 5634**
Title	: **Special Topics in Computer Engineering**
Level	: **5**
Credit Hours	: **3**
Prerequisites	: **Min 108 credit hrs or Consents of Advisor**

AIMS

This module is designed to enable students to cope up with new advances in research in Computer Engineering.

SYLLABUS

Topics
Review of Computer Engineering available today
Advances in Computer Engineering research.
Concentration on a specific research topic in Computer Engineering.

Learning Outcomes

A. Knowledge and Understanding

After completing these modules, engineering students will be able to:

A1. Use research methods and techniques to contribute to a solution of an advanced problem in Computer Engineering.

A2. Pursue further research in Computer Engineering.

Skills

After completing this module, engineering students will be able to:

B. Intellectual Skills:

B1. Acquire research methodology tools in Computer Engineering.

C. Subject Practical Skills

C1. Evaluate the new research ideas with respect to available technology.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline

Teaching/Learning Strategies

- Orientation Sessions.
- Review and discussion Sessions.
- Team projects.
- Presentations.

Learning Materials

Reference Text:

- will be provided by instructor if any.

Supplementary Reading:

- Scientific Papers.
- Research Reports
- Engineering Manuals.
- Technical Catalogues.

Assessment Scheme

- Weekly Lectures.
- Mid- Written and Final written reports.
- Mid and Final oral presentations.

Assessment Pattern

• Course work	40 %
• Mid Term Exam	20%
• Final Exam	40 %
Total	**100 %**

Leaning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF EGINEERING
MODULE OUTLINE

Module Code	**: CSE 5635**
Title	**: Advanced Artificial Intelligence**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: CSE464**

AIMS

This module introduces students to the advanced topics of AI. It presents the latest development in the field that includes Knowledge Based Systems, Probabilistic Reasoning, Simple and Complex Decisions, Machine Learning, Knowledge Discovery, Natural Language Processing, Pattern Recognition, and Robotics. Upon completion of this module, students should be able to develop intelligent systems that integrate several intelligent inference engines, understand the role of knowledge, reasoning and learning in intelligent-system engineering, as well as in understanding human intelligence from a computational perspective.

SYLLABUS

Topics
Knowledge Based Systems
Inference Engines in Knowledge Based Systems
Machine Learning: Empirical Approach
Machine Learning: Analytical Approach
Knowledge Discovery
Data Mining
Natural Language Processing in communication
Pattern Recognition
Voice Recognition
Robotics

LEARNING OUTCOMES

A. Knowledge and Understanding

After completing this course students will be able to:

A1. Assess the applicability, strengths, and weaknesses of the knowledge based systems in different domains.

A2. Augment knowledge based systems with intelligent learning and explanation capabilities.

A3. Illustrate the fundamental concepts of empirical and analytical learning techniques and the difference between the two learning approaches.

A4. Demonstrate the importance of data mining, pattern recognition, and natural language processing.

Skills

After completing this course students will be able to:

B. Intellectual Skills:

B1.Design knowledge based systems augmented with explanation and learning capabilities.

B2. Develop and evaluate multi strategy learning systems that integrate different empirical and analytical methods.

B3. Build and query an intelligent robotic algorithm.

C. Subject Practical Skills

C1- Implement and analyse some pattern recognition, voice recognition, and data mining algorithms.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Lectures.
- Computer Laboratories.
- Tutorials.
- Class Presentations.

Learning Materials

Reference Text:

- Artificial Intelligence: A Modern Approach, 3rd edition, Stuart Russell and Peter Norvig, Prentice Hall, 2010.
- Artificial Intelligence, (Third Edition) by Patrick Henry Winston, 1993.

Supplementary Readings:

- Prolog Programming for Artificial Intelligence", Ivan Bratko, 3rd Edition, Addison-Wesley, 2000.

Software Requirements

- Prolog, Lisp or Java IDE.

Assessment Scheme

- Weekly Written Assignment
- Class Written Tests
- Individual Term Project/Paper.
- Unseen Written Mid-Term Exam
- Unseen Written Final-Exam

Assessment Pattern

• Class Participation	5%
• Assignments	5%
• Tests and Quizzes	10%
• Projects and Reports	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader:

CS Staff

MSA UNIVERSITY
FACULTY OF EGINEERING
MODULE OUTLINE

Module Code	: **CSE 5636**
Title	: **Advanced Topics in Computer Engineering**
Level	: **5**
Credit Hours	: **3**
Prerequisites	: **Min 108 credit hrs or Consents of Advisor**

AIMS

This module is designed to enable students to cope up with new advances in research in Computer Engineering.

SYLLABUS

Topics
Review of Computer Engineering available today
New Trends in Computer Engineering research.
Concentration on a specific advanced topic in Computer Engineering.

Learning Outcomes

A. Knowledge and Understanding

After completing these modules, engineering students will be able to:

A1. Use research methods and techniques to contribute to a solution of an advanced problem in Computer Engineering.

A2. Pursue further research in Computer Engineering.

Skills

After completing this module, engineering students will be able to:

B. Intellectual Skills:

B1. Acquire research methodology tools in Computer Engineering.

B2. Evaluate the new research ideas with respect to available technology.

C. Subject Practical Skills

C1. Apply knowledge of mathematics, science, information technology, and engineering practice integrally to solve computer engineering problems.

D. Transferrable/Key Skills

D1. Communicate effectively.

D2. Search for information and engage in life-long self-learning discipline.

Teaching/Learning Strategies

- Orientation Sessions.
- Review and discussion Sessions.
- Team projects.
- Presentations.

Learning Materials

Reference Text:

- will be provided by instructor if any.

Supplementary Reading:

- Scientific Papers.
- Research Reports

Assessment Scheme

- Weekly Lectures.
- Mid- Written and Final written reports.
- Mid and Final oral presentations.

Assessment Pattern

• Course work	40%
• Mid Term Exam	20%
• Final Exam	40%
Total	100%

Leaning Unit Contact Hours

• Lectures	2.5	hrs / week
• Laboratories	1.5	hrs / week
• Total class contact hours	60	hrs / semester
• Total self-study hours	60	hrs / semester
• Total study hours	120	hrs / semester

Module Leader

Staff

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	: **CSE 564**
Title	: **Graduation Project (Part II)**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: CSE 554**

AIMS

This module is designed to enable senior students, who successfully completed ECE554, to analyze, design, implement, test, and/or operate the designated model, prototype, or method to satisfy the company sponsor's requirements .Students should utilize the fundamental principles and skills gained through their academic studies.

SYLLABUS

Topics
Utilize computer software and / or develop own computer programs.
Choose an appropriate design satisfying the sponsor's requirements.
Implement/operate the designated model or prototype.
Analyze and Interpret the results.
Present recommendations and forward suggestion for further research.
Submit a mid – and final – written report.
Prepare a mid – and final – oral Presentations.
Defend the work done in a committee of external examiners.

Learning Outcomes

A. Knowledge and Understanding

After completing these two modules, engineering students will be able to:

A1. Understand the research methods and the techniques to contribute to a solution of an engineering problem

A2. Identify how to deal with real life engineering, industrial or service systems.

Skills

After completing this module, engineering students will be able to:

B. Intellectual Skills:

B1. Use alternative approaches and designs, on the basis of engineering principles to meet those requirements.

B2. Develop a method to implement and operate the designated model or the Prototype that meets the intended requirements.

C. Subject Practical Skills:

C1. Implement the project.

C2. Verify the implementation against the design.

C3. Validate the results against the requirements, using performance measures.

D.Transferrable/Key Skills:

D1. Demonstrate effective time management.

D2. Develop their skills for an effective and focused involvement while working with teams work effectively with others in a team.

D3. Demonstrate and communicate their ideas effectively.

Teaching/Learning Strategies

- Orientation Sessions.
- Review and discussion Sessions.
- Team projects.
- Presentations.
- Field trips

Learning Materials

Software Requirements

- Suitable software packages and/or.
- Building own computer programs.

Reference Text:

- Suitable textbooks and scientific journals in the field of the project.

Supplementary Reading:

- Scientific Papers.
- Research Reports
- Engineering Manuals.
- Technical Catalogues.

Assessment Scheme

- Weekly contacts with supervisor.
- Mid- Written and Final written reports.
- Mid and Final oral presentations.

Assessment Pattern

• Supervisor's Evaluation	40 %
• Mid Term Evaluation	20%
• Examiners' Staff Evaluation	40 %
Total	**100 %**

Leaning Unit Contact Hours

• Sessions Labs	9	hrs / week
• Total class contact hours	135	hrs / semester
• Total self-study hours	135	hrs / semester
• Total study hours	270	hrs / semester

Module Leader

Staff

CHAPTER V

PROGRAMME SPECIFICATION

1. Awarding Institution	2. Teaching Institution	3. Faculty/Department	
University of Greenwich	October University for Modern Sciences and Arts (MSA)	Engineering	Computer Systems Engineering
4. Final Award	**5. Programme Title and approved end o r sements:**	**6. Qualification Level as defined by the UK Framework for Higher Education Qualifications** (Please refer to D5 Guidance notes)	
B.Sc. (Hons) **Computer Systems Engineering (MSA)**	Electrical Communication and Electronic Systems Engineering	**4**	**5** / **6**
		---	--- / √
7. Accredited by:	**8. UCAS Code:**		
Supreme Council for Egyptian Universities	None		
9. Maximum/ Minimum Period(s) of Registration			
F/T Minimum5 years –Maximum10years N.B. Minimum period can be 4.5 years equivalent to 9 regular semesters with condition of 168 credits completed.	P/T N/A	SW N/A	D/L N/A
10. Programme Code		**11. Last Revision date for Programme Specification**	
BSc (Hons.) P11228		2014/2015…….	

12. External Reference Points, e.g. subject benchmark statements and professional body requirements

The following reference points were used in designing the program:

- Supreme Council for Egyptian Universities (SCEU) Regulations.
- Criteria established by the Committee for Engineering Education set up by SCEU.
- QAA guidelines for program specifications.
- MSA University Council.
- Faculty of Engineering Quality Assurance Audit Unit.

13. Entry Requirements

- Accruing the Entry score set by Supreme Council for Egyptian Universities.
- Passing MSA English placement entry Exam.
- Submitting authenticated original certificate and documentation.

14. Educational Aims of the Programme and Potential Career Destinations of Graduates [Maximum 150 words]:

The Computer Systems Engineering (CSE) program is a discipline that embodies the science and technology of design, construction, implementation, and maintenance of software and hardware components of modern computing systems and computer-controlled equipment. Computer systems engineering has traditionally been viewed as a combination of both computer sciences (CS) and electrical engineering (EE). Computer systems engineering is a field

that experiences effects from rapid technological development in different real life applications.
The program aims for the computer systems engineering graduate to be:

- Trained to be proficient in the design and implementation of computer systems, both hardware and software.
- Design digital control circuitry and program it to function correctly.
- Knowledgeable in related mathematics, physics sciences, electrical, electronics, communications, computer hardware and software, networking and other engineering concepts and systems.
- Expert through practicing the discipline concepts in solving problems of real applications. This level of expertise should be permanently upraised by engaging in life-long learning processes.
- Provide support for multinational and local institutions.

15. Summary of Skills Development for Students within the Programme [Maximum 150 words]:

The student of the CSE Program will be able to develop basic skills in digital systems, microprocessors, microcontrollers, programming and interfacing techniques. Upon graduation, the student will be able to work creatively and flexibly in a variety of media from design, operation or maintenance of computers and digital systems. Furthermore, the programme provides the opportunity to improve the capacity for independent work while maintaining and developing the student's ability to work in groups.
The CSE program develops the following skills for its graduates:

- The intellectual and practical skills necessary for the student in Computer Systems Engineering area.
- The ability to support for multinational and local institutions.
- The capability to work in private and governmental firms and agencies, where it is required to design, manufacture, operate, develop or maintain computer systems or computer-controlled systems.

16. The programme provides opportunities for students to achieve the following outcomes:

Knowledge and Understanding :

After completion of the programme, the student will be able to demonstrate knowledge and understanding of:

A1. Concepts and theories of engineering mathematics, engineering physics, engineering mechanics, and Engineering Drawing.
A2. Basics of programming and software development
A3. Characteristics of engineering materials used in electronic circuits and components.
A4. Measurement and instrumentation of electrical and electronic circuits.
A5. Engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real- time systems and reliability analysis.
A6. Quality assessment of computer systems.
A7. Related research and current advances in the field of computer software and hardware.
A8. Technologies of data, image and graphics representation and organization on computer storage media.
A9. Modern trends in information technology and its fundamental role in business enterprises.
A10. Technical language and research writing.
A11. Methodologies of solving engineering problems, data collection and interpretation
A12. Codes of practice and standards, health and safety requirements, Topics related to humanitarian interests, and environmental issues.
A13. Business and management principles relevant to engineering, professional ethics and impacts of Engineering solutions on society and environment.
A14. Information theory, Coding and decoding techniques.
A15. Concepts of artificial intelligence and expert systems.
A16. Engineering systems description, analysis and control.
A17. Advanced and new trends of Computer systems and networks.

A18. Advanced and contemporary engineering topics.

17. The programme provides opportunities for students to develop the following skills:

Intellectual Skills:

After completion of the programme, the student will be able to:

After completion of the programme, the student will be able to:

B1. Select the appropriate mathematical tools, computing methods, design techniques for modeling and analyzing computer systems;
B2. Select, synthesize, and apply suitable IT tools to computer engineering problems.
B3. Proposing various computer-based solutions to business system problems.
B4. Analyse the performance of digital systems
B5. Capability of integrating computer objects running on different system configurations.
B6. Innovating solutions based on non-traditional thinking and the use of latest technologies
B7. Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.
B8. Investigate and troubleshoot the failure of digital systems at various levels.
B9. Evaluate engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environment.
B10. Incorporate economic, societal, environmental dimensions and risk management in design.
B11. Create systematic and methodical approaches when dealing with new and advancing technology.
B12. Develop analytical models for engineering problems and expert systems.
B13. Develop innovative solutions for the practical industrial problems.

Professional and Practical Skills:

After completion of the programme, the student will be able to:

C1. Integrate software and hardware modules from different vendors to design new products and/or services.
C2. Create and/or re-design a process, component or system, and carry out specialized computer systems designs.
C3. Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyse and interpret results.
C4. Use a wide range of analytical tools, techniques, equipment, and software packages pertaining to the discipline and develop required computer programs.
C5. Apply safe systems at work and observe the appropriate steps to manage risks.
C6. Apply appropriate mathematical methods or IT tools.
C7. Use relevant laboratory equipment and analyse the results correctly.
C8. Identify appropriate specifications for required devices.
C9. Apply computer programming for the design and diagnostics of digital systems.
C10. Design and operate computer-based systems specifically designed for business applications.
C11. Use appropriate specialized computer software, computational tools and design packages throughout the phases of the life cycle of system development;
C12. Write computer programs on professional levels achieving acceptable quality measures in software development.
C13. Utilize the appropriate tools to measure digital system performance.

General and Transferable Skills:

After completion of the program, the student will be able to:

D1. Collaborate effectively within multidisciplinary team.
D2. Work in stressful environment and within constraints and apply risk analysis.
D3. Communicate effectively.

D4. Demonstrate efficient IT capabilities.
D5. Lead and motivate individuals
D6. Effectively manage tasks, time, and resources
D7. Search for information and engage in life-long self-learning discipline.
D8. Acquire entrepreneurial skills.
D9. Refer to relevant literatures.
D10. Acquire basic project management skills
D11. Demonstrate basic organizational and project management skills.
D12. Prepare and present technical reports.

Graduate Attributes:

The graduates of the Computer Systems Engineering programme should be able to:

a. Apply knowledge of computing, mathematics, physics and logical skills appropriate to the computer engineering discipline.
b. Analyze a problem, and identify and define the computing requirements appropriate to its solution.
c. Design, implement and evaluate a 'computer-based system, process, component, or program to meet desired needs.
d. Use general computer and software tools professionally.
e. Analyze operations, realize requirements and constraints of projects and, consequently, achieve an appropriate cost effective design.
f. Perform troubleshooting in computer systems.
g. Exhibit competency in English as a second language as suitable for the discipline.
h. Demonstrate inductive reasoning abilities, figuring general rules and conclusions about seemingly unrelated events.
i. Analyze the local and global impact of computing on individuals, organizations and society.
j. Use current advanced techniques, skills, and tools necessary for computing practices.

Greenwich Graduate Attributes

Your programme of study will be developing the Greenwich Graduate Attributes. This will be reflected in its learning outcomes and will be embedded in its specific discipline areas.
The University of Greenwich has always aimed to provide an environment that allows students to maximize their potential. In meeting the challenges of today's tough and changing world our consultation with staff and students resulted in defining distinctive characteristics for the Greenwich Graduate. These explicit behaviors, values, skills and dispositions that we expect our students to develop will best prepare them for their future careers and help us to reshape student learning and assessment activities.
A flourishing scholarly community, with an ethos of sustainability and a global outlook, full of confident, distinctive students, always learning, always developing.

Scholarship and autonomy

The University of Greenwich is committed to developing graduates who:

- Have an informed understanding of their discipline or professional practice, and the ability to question its principles, practices and boundaries.
- Think independently, analytically and creatively, and engage imaginatively with new areas of investigation.
- Appreciate disciplines and forms of professional practice beyond their own, and draw connections between them.
- Are intellectually curious, responsive to challenges, and demonstrate initiative and resilience.

Creativity and enterprise

The University of Greenwich is committed to giving its graduates the confidence to:

- Recognize and create opportunities, and respond effectively to unfamiliar or unprecedented situations or problems.
- Generate new ideas and develop creative solutions or syntheses.
- Communicate clearly and effectively, in a range of forms, taking account of different audiences.

- Make use of familiar and emerging information and communication technologies.
- Seize and shape the opportunities open to them on leaving university.

Cross-cultural and international awareness

The University of Greenwich is committed to producing graduates who:

- Engage effectively in groups whose members are from diverse backgrounds.
- Appreciate the importance of behaving sustainably.
- Move fluently between different cultural, social and political contexts.
- Value the ability to communicate in more than one language.

MSA Mapping of Greenwich Graduate Attributes for CSE Programme:

The University of Greenwich initiative for graduates (Greenwich Graduate Attributes) seeks to recognize that while disciplinary knowledge is important, graduates will leave with skills and values which will equip them for life outside the university. At MSA, the same objective has been in place although not similarly categorized. Much of what lies at the heart of the initiative is present in the MSA Graduate Attributes, as will be discussed below.

The initiative recognizes three core elements: *Scholarship and autonomy*, *Creativity and enterprise,* and *Cross-cultural and International awareness* which are seen as the elements which reflect most the University of Greenwich.

Scholarship and autonomy:

MAT 351 Mathematical Analysis and Numerical Methods.
CSE352 Microprocessor.
ECE353 Electronic Systems Analysis I.
CSE 354 Algorithms and Data Structure.
ECE 355 Data Communication
ECE 356 Electronic Measurement Instruments .

Term : Spring

MAT 361 Probability and Statistics.
CSE 362 Digital Systems Interfacing.
ECE363 Electronic Systems Analysis II.
CSE 364 Operating Systems.
ECE 365 Linear Systems.
CSE366 Computer Networks.

CSE 451 Concepts of Programming Languages.
CSE 452 Software Engineering.
CSE 453x CSE Elective I.
CSE 454 Systems analysis and Design.
ECE 455 Automatic Control Systems.
CSE 456 Computer Architecture.

Term : Spring

CSE 461 Computer Security.
CSE 462a Fundamental of Database.
CSE 463x CSE Elective II.
CSE 464a Artificial Intelligence.
ECE 465 Information Theory and Coding.
ECE 466 Digital Signal Processing.
ECE 551 Electrical Energy Conversion.
ECE 552 Mobile Communication Systems.

CSE 553x CSE Elective III.
CSE 554 Graduation Project (Part I).

Term : Spring

ECE 561 VLSI.
MSA department of CSE Systems Engineering graduates have an informed understanding of their discipline prior to graduation through years 2, 3, 4 and 5 courses, namely:
CSE352 Microprocessor, CSE 354 Algorithms and Data Structure, CSE 362 Digital Systems Interfacing, CSE 364 Operating Systems, CSE 451 Concepts of Programming Languages, CSE 452 Software Engineering, CSE 454 Systems analysis and Design, CSE 456 Computer Architecture, CSE 461 Computer Security, CSE 462a Fundamental of Database and CSE 464a Artificial Intelligence which prepare students to life after university. The former introduces them to the various career paths they might tread as graduates of Computer Systems Engineering, the professional body to which they will become members (Egyptian Syndicate of Engineers). The key issues of CSE Engineering, the intelligent systems, automation and key concepts of inter-disciplinary Engineering (items of the knowledge and Understanding) Intended Learning Outcomes, and items of the Intellectual Skills that students will be able to demonstrate). They will be able to interact critically with the institutional structures within which SCE Engineering practice takes place (items of Graduate Attributes, previously mentioned). Through the latter along with the Design courses they become familiar with the technical engineering knowledge and concepts necessary for the chosen profession (items of the knowledge and Understanding Intended Learning Outcomes, and items of the Professional and Practical Skills).

They come to appreciate disciplines and forms of professional practice through the choice between elective courses in years 4 and 5. The Special Topics in Computers (ECE 5634), Advanced Topics in Computers (CSE 5636), and Advanced Artificial Intelligence (CSE 5635) which introduce them to the related disciplines which they will be dealing with in the field when they graduate. Lastly, and through the previous courses, students in Computer Systems Engineering could specialize in any of those related disciplines upon graduation which opens up career paths for MSA graduates.

Creativity and enterprise:

MSA department of Computers Systems Engineering graduates learn to be creative through the Digital Logic Design courses (ECE 254, ECE264), Microprocessor(CSE352), Digital Systems Interfacing(CSE362) and Computer Architecture (CSE456) in years 2, 3 and 4 of the programme, and through the Graduation Projects (CSE 554 and CSE564) during the 5th year of the program. They are mentally challenged to come up with unique and original

conceptions. Through this rigorous process they are taught to be innovative and resourceful. Additionally, they are drilled to be able to defend their design decisions through presentations. They develop confidence with graphic and verbal communication and presentation skills. Accordingly, they can communicate clearly and effectively both graphically using a variety of media and verbally to different audiences (items of the Graduate Attribute), and (items of the Transferable skills).

Through the Engineering Drawing course (GSE 154n), Engineering Computer Programming I and II Courses (COM 253), the Mathematical Analysis and Numerical Methods course (MAT 351), and the Probability and Statistics Course (MAT 361), , they are equipped with the tools necessary to explore and experiment with new software and emerging information and communication technologies (items of Practical Skills and Graduate Attributes).

Cross-cultural and International Awareness:

MSA department of Computer Systems Engineering students of level 4 can opt for the joint summer elective with the University of Greenwich whereby they work jointly with their British counterparts. Moreover, the student body at MSA is diverse with Egyptian and Non-Egyptian students especially from other Arab Countries. Most MSA students are multi-lingual and can converse in English and Arabic, those from French schools could speak the three languages. This could enhance their chances of employability in multi-national establishments worldwide (*Graduate Attribute* items).

18. Teaching, Learning and Assessment Methods related to the programme learning outcomes and skills sets

1- Knowledge and Understanding :

Teaching/Learning methods:

- Attainment of items 1, 2, 3, 4 and 5 through lectures and tutorials in years 1, 2 and3.
- Attainment of item 6 to 18 through lectures, tutorials, labs sessions, practical projects and through field trips in years.

Assessment:

- Assessment of all items through assignments with various levels of complexity, class exams, unseen mid-term and final exams, discussions of research papers, case-studies, presentation and mini-projects both individual and team or group work.

2- Intellectual Skills

Teaching/Learning:

- Attainment of all items through assignments, and mini projects and graduation projects..

Assessment:

- Assessment of all items through class exams, unseen mid-term and final exams, oral presentations and discussion of mini and graduations projects (Power point or Poster presentations).

3- Practical Skills:

Teaching/learning:

- Attainment of items 1 to 7 through case studies, mini-projects, and graduation project and that in years2, 3 and 4 (both individual and team or group work).
- Attainment of items 8 to 13 through computer labs, and graduation project and that in years 3, 4 and 5 and summer training.

Assessment:

- Assessment of items 1 to 7 is through reports, oral presentations and discussions (power point or poster presentations).
  Assessment of items 8 t0 13 is through computer lab exams, and oral (power point or poster) presentations and summer training.

4- Transferable Skills:

Teaching/learning:

- Attainment of items 1 to 4 through lectures, mini-projects, research work, graduation projects, and summer training, and that in years 1 to 5.
- Attainment of items 5 to 12 through graduation project and training especially in year 5.

Assessment:

- Assessment of all items through class exams, unseen mid-term and final exams, oral presentations and discussion of mini and graduations projects (Power point or Poster presentations).

19. Programme Structure: Levels, Courses[1] and Credits		***Awards and Credits***
Level4	**Compulsory Courses** **Term : Fall** MAT 351 Mathematical Analysis and Numerical Methods. CSE352 Microprocessor. ECE353 Electronic Systems Analysis I. CSE 354 Algorithms and Data Structure.	Certificate of Higher Education (Cert. HE)

[1]Please indicate clearly whether a course runs in Term 1, Term 2 or across the academic year

	ECE 355 Data Communication ECE 356 Electronic Measurement Instruments . **Term : Spring** MAT 361 Probability and Statistics. CSE 362 Digital Systems Interfacing. ECE363 Electronic Systems Analysis II. CSE 364 Operating Systems. ECE 365 Linear Systems. CSE366 Computer Networks. **Optional Courses: -----** **Courses required for named endorsements** (if applicable N/A))	NA
Level5	**Compulsory Courses:** **Term : Fall** CSE 451 Concepts of Programming Languages. CSE 452 Software Engineering. CSE 453x CSE Elective I. CSE 454 Systems analysis and Design. ECE 455 Automatic Control Systems. CSE 456 Computer Architecture. **Term : Spring** CSE 461 Computer Security. CSE 462a Fundamental of Database. CSE 463x CSE Elective II. CSE 464a Artificial Intelligence. ECE 465 Information Theory and Coding. ECE 466 Digital Signal Processing. **Optional Courses: Electives I and II** Optional courses required for named endorsements (if applicable)	Diploma of Higher Education (Dip. HE) NA
Level6	**Compulsory Courses** **Term : Fall** ECE 551 Electrical Energy Conversion. ECE 552 Mobile Communication Systems. CSE 553x CSE Elective III. CSE 554 Graduation Project (Part I). **Term : Spring** ECE 561 VLSI. HUM 562 Ethics, Safety and Health. CSE 563x CSE Elective IV. CSE 564 Graduation Project (Part II). **Optional Courses: Electives III and IV** **Optional courses required for named endorsements** (if applicable)	Honours Degree: BSc. (Hons.) , Computer Systems Engineering 168 Credits. NA

CHAPTER VI

Mapping Courses to Programme Attributes and Programme Skills

As previously mentioned in Chapter V (Program Specification), the programme Attributes and Programme Skills are as follows:

6.1 The Programme Attributes:

The graduates of the Computer Systems Engineering programme should be able to:

a. Apply knowledge of computing, mathematics, physics and logical skills appropriate to the computer engineering discipline.
b. Analyze a problem, and identify and define the computing requirements appropriate to its solution.
c. Design, implement and evaluate a 'computer-based system, process, component, or program to meet desired needs.
d. Use general computer and software tools professionally.
e. Analyze operations, realize requirements and constraints of projects and, consequently, achieve an appropriate cost effective design.
f. Perform troubleshooting in computer systems.
g. Exhibit competency in English as a second language as suitable for the discipline.
h. Demonstrate inductive reasoning abilities, figuring general rules and conclusions about seemingly unrelated events.
i. Analyze the local and global impact of computing on individuals, organizations and society.
j. Use current advanced techniques, skills, and tools necessary for computing practices.

6.2 The Programme Skills:

The graduates of the Computer Systems Engineering programme should be able to demonstrate the following skills:

6.2.1 Knowledge and Understanding

A1. Concepts and theories of engineering mathematics, engineering physics, engineering mechanics, and Engineering Drawing.
A2. Basics of programming and software development
A3. Characteristics of engineering materials used in electronic circuits and components.
A4. Measurement and instrumentation of electrical and electronic circuits.
A5. Engineering principles in the fields of logic design, circuit analysis, machine and assembly languages, computer organization and architectures, memory hierarchy, advanced computer architectures, embedded systems, signal processing, operating systems, real- time systems and reliability analysis.
A6. Quality assessment of computer systems.
A7. Related research and current advances in the field of computer software and hardware.
A8. Technologies of data, image and graphics representation and organization on computer

storage media.

A9. Modern trends in information technology and its fundamental role in business enterprises.

A10. Technical language and research writing.

A11. Methodologies of solving engineering problems, data collection and interpretation

A12. Codes of practice and standards, health and safety requirements, Topics related to humanitarian interests, and environmental issues.

A13. Business and management principles relevant to engineering, professional ethics and impacts of Engineering solutions on society and environment.

A14. Information theory, Coding and decoding techniques. A15. Concepts of artificial intelligence and expert systems. A16. Engineering systems description, analysis and control.

A17. Advanced and new trends of Computer systems and networks.

A18. Advanced and contemporary engineering topics.

6.2.2 Intellectual skills

B1. Select the appropriate mathematical tools, computing methods, design techniques for modeling and analyzing computer systems;

B2. Select, synthesize, and apply suitable IT tools to computer engineering problems.

B3. Proposing various computer-based solutions to business system problems.

B4. Analyse the performance of digital systems

B5. Capability of integrating computer objects running on different system configurations.

B6. Innovating solutions based on non-traditional thinking and the use of latest technologies

B7. Combine, exchange, and assess different ideas, views, and knowledge from a range of sources.

B8. Investigate and troubleshoot the failure of digital systems at various levels.

B9. Evaluate engineering decisions considering balanced costs, benefits, safety, quality, reliability, and environment.

B10. Incorporate economic, societal, environmental dimensions and risk management in design.

B11. Create systematic and methodical approaches when dealing with new and advancing technology.

B12. Develop analytical models for engineering problems and expert systems

B13. Develop innovative solutions for the practical industrial problems.

6.2.3 Subject Practical Skills

C1. Integrate software and hardware modules from different vendors to design new products and/or services.

C2. Create and/or re-design a process, component or system, and carry out specialized computer systems designs.

C3. Use computational facilities and techniques, measuring instruments, workshops and laboratory equipment to design experiments, collect, analyse and interpret results.

C4. Use a wide range of analytical tools, techniques, equipment, and software

packages pertaining to the discipline and develop required computer programs.

C5. Apply safe systems at work and observe the appropriate steps to manage risks.

C6. Apply appropriate mathematical methods or IT tools.

C7. Use relevant laboratory equipment and analyse the results correctly.

C8. Identify appropriate specifications for required devices.

C9. Apply computer programming for the design and diagnostics of digital systems.

C10. Design and operate computer-based systems specifically designed for business applications.

C11. Use appropriate specialized computer software, computational tools and design packages throughout the phases of the life cycle of system development;

C12. Write computer programs on professional levels achieving acceptable quality measures in software development.

C13. Utilize the appropriate tools to measure digital system performance.

6.2.4 Transferrable/key skills

D1. Collaborate effectively within multidisciplinary team.

D2. Work in stressful environment and within constraints and apply risk analysis.

D3. Communicate effectively.

D4. Demonstrate efficient IT capabilities.

D5. Lead and motivate individuals

D6. Effectively manage tasks, time, and resources

D7. Search for information and engage in life-long self-learning discipline.

D8. Acquire entrepreneurial skills.

D9. Refer to relevant literatures.

D10. Acquire basic project management skills

D11. Demonstrate basic organizational and project management skills.

D12. Prepare and present technical reports.

6.3 Mapping of All Courses to Programme Attributes:

The following table illustrates the mapping of all courses to the programme attributes.

Course Code	Course Title	Program Attributes									
		a	b	c	d	e	f	g	h	i	j
MAT151	Calculus I	√									
BSC152	Engineering physics I	√	√								
GSE153	Engineering mechanics I	√									
GSE154n	Engineering Drawing	√									
COM155	Information Technology	√									
ENG156	Ac. English Writing							√			
MAT161	Calculus II	√									
BSC162	Engineering Physics II	√	√								
GSE163	Engineering Mechanics II	√									
BSC164	Chemistry	√									
GSE165	Workshop Technology	√									
ENG166	Tech. English Writing							√			
MAT251	Linear Algebra	√									
BSC252	Modern Physics	√	√								
ESE253	Electric Circuit Analysis I	√	√				√				
ECE254	Digital Design I	√	√				√				
COM255	Computer Program. I	√			√						
ENG256	Res. English Writing							√			
MAT261	Differential Equations	√									
ESE262	Physics of Electrical Materials	√									
ESE263	Electric Circuit Analysis II	√	√				√				
ECE264	Digital Design II	√	√				√				
COM265	Computer Program. II	√			√						
HUM266	Project Managem. Syst.					√			√	√	
MAT351	Mathematical analysis	√									
CSE352	Microprocessor Systems	√									
ECE353	Electronic Circuit Analysis I	√	√				√				
CSE354	Algorithms and Data Structure		√	√	√						
ECE355	Data Communication	√									
ECE356	Electronic Measurements Instruments		√				√				
MAT361	Probability and Statics	√									

CSE362	Digital Syst. Interfacing	√									
ECE363	Electronic Circuits Analysis II	√	√				√				
CSE364	Operating Systems				√						
ECE365	Linear Systems	√									
CSE366	Computer Networks	√									
CSE451	Object-Oriented Program.				√						
CSE452	Software Engineering		√	√	√						
CSE4531	Industrial Electronics		√								
CSE4532	Advanced Operating Syst.				√						
CSE4533	Robot Dynamics and Control	√									
CSE4534	File Access and Management				√						
CSE454	System Analysis and Design		√								
ECE455	Automatic Control Syst.	√									
CSE456	Computer Architecture	√									
CSE461	Computer Security				√						
CSE462a	Database Design		√		√						
CSE4631	Cryptography				√						
CSE4632	Human Computer Interaction				√						
CSE4633	Theory of Computing			√							
CSE4634	Image Processing				√						
CSE464a	Artificial Intelligence				√						√
ECE465	Information Theory and Coding	√									
ECE466	Digital Signal Processing	√									
ESE551	Electrical Energy Conversion	√									
ECE552	Mobile Communication Systems	√									
CSE5531	Web Design Concepts				√						
CSE5532	Database Theory				√						
CSE5533	Speech Signal Processing				√						
CSE5534	Special Topics in Electronics				√				√	√	√
CSE554	Grad. Project I				√				√	√	√
ECE561	VLSI	√									
HUM562	Ethics, Safety and Health										
CSE5631	Spread Spectrum Techniques	√									
CSE5632	Neutral Networks				√						

CSE5633	Compiler Design				√						
CSE5634	Special Topics Computer Engineering				√						√
CSE5635	Advanced Artificial Intelligence				√						√
CSE5636	Advanced Topics in Computer Engineering								√	√	√
CSE564	Grad. Project II				√				√	√	√

6.4 Mapping of All Courses to Programme Skills:

The following table illustrates the mapping of all courses to the programme skills.

ILOs

Code	Course Title		Knowledge and Understanding																
		A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	A17	A18
MAT151	Calculus I	√																	
BSC152	Engineering physics I	√																	
GSE153	Engineering mechanics I	√																	
GSE154n	Engineering Drawing	√																	
COM155	Information Technology		√							√									
ENG156	Ac. English Writing										√								
MAT161	Calculus II	√																	
BSC162	Engineering Physics II	√																	
GSE163	Engineering Mechanics II	√																	
BSC164	Chemistry												√						
GSE165	Workshop Technology											√	√	√					
ENG166	Tech. English Writing										√								
MAT251	Linear Algebra	√																	
BSC252	Modern Physics	√																	
ESE253	Electric Circuit Analysis I				√	√						√					√		
ECE254	Digital Design I				√	√						√					√		
COM255	Computer Program. I		√				√	√		√									
ENG256	Res. English Writing										√								
MAT261	Differential Equations	√																	
ESE262	Physics of Electrical Materials	√		√															
ESE263	Electric Circuit Analysis II	√			√	√						√					√		

ECE264	Digital Design II				√	√						√					√		
COM265	Computer Program. II		√				√	√		√									
HUM266	Project Managem. Syst.		√					√		√	√	√	√						
MAT351	Mathematical analysis	√	√									√							
CSE352	Microprocessor Systems		√			√	√	√	√								√		
ECE353	Electronic Circuit Analysis I			√	√	√						√					√		
CSE354	Algorithms and Data Structure		√					√	√			√							
ECE355	Data Communication						√	√	√	√		√			√				
ECE356	Electronic Measurements Instruments				√														
MAT361	Probability and Statics	√							√						√		√		
CSE362	Digital Syst. Interfacing		√	√	√	√	√	√											
ECE363	Electronic Circuits Analysis II			√	√	√						√					√		
CSE364	Operating Systems		√			√	√	√	√	√									
ECE365	Linear Systems	√																	
CSE366	Computer Networks		√				√	√	√	√					√			√	√
CSE451	Object-Oriented Program.		√					√	√			√							
CSE452	Software Engineering		√				√	√	√	√									
CSE4531	Industrial Electronics			√	√	√						√	√	√					
CSE4532	Advanced Operating Syst.		√			√	√	√	√	√		√						√	√
CSE4533	Robot Dynamics and Control						√	√				√		√			√		
CSE4534	File Access and Management		√					√	√	√		√		√					
CSE454	System Analysis and Design											√					√		
ECE455	Automatic Control Syst.	√						√	√								√		
CSE456	Computer Architecture					√	√	√	√								√		
CSE461	Computer Security		√				√	√	√	√				√	√				
CSE462a	Database Design		√					√	√	√		√		√					√
CSE4631	Cryptography	√	√					√	√						√				
CSE4632	Human Computer Interaction		√			√		√	√	√		√	√	√			√		
CSE4633	Theory of Computing	√	√					√											
CSE4634	Image Processing		√			√		√	√				√				√		
CSE464a	Artificial Intelligence		√			√		√	√				√			√			
ECE465	Information Theory and Coding	√						√	√				√		√				

ECE466	Digital Signal Processing	√				√		√	√								√		
ESE551	Electrical Energy Conversion			√	√							√	√	√					
ECE552	Mobile Communication Systems		√			√	√	√	√	√		√		√				√	√
CSE5531	Web Design Concepts		√							√		√		√					
CSE5532	Database Theory		√					√	√	√		√		√					
CSE5533	Speech Signal Processing	√				√		√	√				√						
CSE5534	Special Topics in Electronics			√	√			√											√
CSE554	Grad. Project I		√		√	√					√	√	√	√			√		
ECE561	VLSI		√	√			√												
HUM562	Ethics, Safety and Health												√	√					
CSE5631	Spread Spectrum Techniques							√	√										
CSE5632	Neutral Networks		√			√	√	√	√				√			√			
CSE5633	Compiler Design		√		√	√	√	√	√	√		√					√		
CSE5634	Special Topics Computer Engineering		√			√	√	√	√			√					√	√	√
CSE5635	Advanced Artificial Intelligence		√			√		√	√				√			√		√	
CSE5636	Advanced Topics in Computer Engineering		√			√	√	√	√			√					√	√	√
CSE564	Grad. Project II		√		√	√					√	√	√	√			√		

Code	Course Title	Intellectual Skills												
		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
MAT151	Calculus I	√												
BSC152	Engineering physics I	√												
GSE153	Engineering mechanics I	√												
GSE154n	Engineering Drawing	√	√											
COM155	Information Technology	√	√			√								
ENG156	Ac. English Writing										√			
MAT161	Calculus II	√												
BSC162	Engineering Physics II	√												
GSE163	Engineering Mechanics II	√												
BSC164	Chemistry	√												
GSE165	Workshop Technology	√												
ENG166	Tech. English Writing										√			
MAT251	Linear Algebra	√												
BSC252	Modern Physics	√												
ESE253	Electric Circuit Analysis I	√												
ECE254	Digital Design I	√			√		√	√	√	√				
COM255	Computer Program. I		√			√								
ENG256	Res. English Writing										√			
MAT261	Differential Equations	√												
ESE262	Physics of Electrical Materials	√												
ESE263	Electrical Circuit Analysis II		√		√									
ECE264	Digital Design II		√		√		√	√	√	√				
COM265	Computer Program. II		√			√								
HUM66	Project Managem. Syst.			√			√			√	√			
MAT351	Mathematical analysis	√												
CSE352	Microprocessor Systems				√							√		

ECE353	Electronic Circuit Analysis I				√									
CSE354	Algorithms and Data Structure	√						√			√			
ECE355	Data Communication							√						
ECE356	Electronic Measurements Instruments				√				√					
MAT361	Probability and Statics	√												
CSE362	Digital Syst. Interfacing		√	√	√	√			√	√		√		√
ECE363	Electronic Circuits Analysis II				√									
CSE364	Operating Systems	√	√	√						√			√	
ECE365	Linear Systems	√												
CSE366	Computer Networks	√			√	√				√		√	√	
CSE451	Object-Oriented Program.	√				√								
CSE452	Software Engineering		√	√	√								√	
CSE4531	Industrial Electronics				√			√		√		√		
CSE4532	Advanced Operating Syst.	√	√		√									
CSE4533	Robot Dynamics and Control		√	√	√				√	√		√		√
CSE4534	File Access and Management		√	√						√	√			
CSE454	System Analysis and Design	√	√		√		√	√		√				
ECE455	Automatic Control Syst.	√	√	√	√				√	√		√		√
CSE456	Computer Architecture		√		√									
CSE461	Computer Security			√	√									
CSE462a	Database Design	√	√	√			√	√		√			√	
CSE4631	Cryptography	√												
CSE4632	Human Computer Interaction		√	√		√			√			√		√
CSE4633	Theory of Computing	√												
CSE4634	Image Processing	√	√	√	√					√			√	
CSE464a	Artificial Intelligence	√	√	√						√			√	
ECE465	Information Theory and Coding	√												
ECE466	Digital Signal Processing	√	√											
ESE551	Electrical Energy Conversion				√			√	√	√		√		
ECE552	Mobile Communication Systems		√	√	√					√		√		√
CSE5531	Web Design Concepts		√	√			√			√				
CSE5532	Database Theory	√		√										
CSE5533	Speech Signal Processing	√	√		√									

CSE5534	Special Topics in Electronics							√	√			√		
CSE554	Grad. Project I		√	√	√		√	√	√	√	√	√	√	√
ECE561	VLSI		√		√									
HUM562	Ethics, Safety and Health									√				√
CSE5631	Spread Spectrum Techniques	√	√		√								√	
CSE5632	Neutral Networks	√	√		√	√							√	
CSE5633	Compiler Design	√	√		√		√			√				
CSE5634	Special Topics Computer Engineering					√				√		√		
CSE5635	Advanced Artificial Intelligence	√	√										√	
CSE5636	Advanced Topics in Computer Engineering					√				√		√		
CSE564	Grad. Project II		√	√	√		√	√	√	√	√	√	√	√

Code	Course Title	Subject Practical Skills												
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
MAT151	Calculus I						√							
BSC152	Engineering physics I							√						
GSE153	Engineering mechanics I			√										
GSE154n	Engineering Drawing						√	√						
COM155	Information Technology						√	√						
ENG156	Ac. English Writing								√					
MAT161	Calculus II						√							
BSC162	Engineering Physics II							√						
GSE163	Engineering Mechanics II							√						
BSC164	Chemistry					√		√						
GSE165	Workshop Technology			√		√			√					
ENG166	Tech. English Writing								√					
MAT251	Linear Algebra						√							
BSC252	Modern Physics			√										
ESE253	Electric Circuit Analysis I			√				√	√					
ECE254	Digital Design I		√	√				√	√					
COM255	Computer Program. I				√		√	√		√				
ENG256	Res. English Writing								√					
MAT261	Differential Equations						√							
ESE262	Physics of Electrical Materials			√										
ESE263	Electric Circuit Analysis II			√				√						

ECE264	Digital Design II		√	√				√	√	√				
COM265	Computer Program. II				√		√			√				
HUM266	Project Managem. Syst.		√					√			√			
MAT351	Mathematical analysis					√								
CSE352	Microprocessor Systems	√	√	√				√		√			√	
ECE353	Electronic Circuit Analysis I			√				√	√					
CSE354	Algorithms and Data Structure				√		√					√	√	
ECE355	Data Communication			√		√		√				√		√
ECE356	Electronic Measurements Instruments			√				√	√					√
MAT361	Probability and Statics						√							
CSE362	Digital Syst. Interfacing	√		√	√	√		√	√	√	√			
ECE363	Electronic Circuits Analysis II			√			√		√					
CSE364	Operating Systems		√		√		√					√	√	
ECE365	Linear Systems		√											
CSE366	Computer Networks			√	√	√	√	√		√	√	√	√	√
CSE451	Object-Oriented Program.				√							√	√	
CSE452	Software Engineering	√			√		√					√		
CSE4531	Industrial Electronics			√					√					
CSE4532	Advanced Operating Syst.		√		√		√				√	√	√	
CSE4533	Robot Dynamics and Control			√	√	√		√	√	√	√			
CSE4534	File Access and Management				√							√	√	
CSE454	System Analysis and Design	√	√											
ECE455	Automatic Control Syst.								√	√	√			
CSE456	Computer Architecture		√							√	√	√		√
CSE461	Computer Security		√		√	√				√		√	√	
CSE462a	Database Design		√		√	√	√	√		√	√	√	√	
CSE4631	Cryptography						√					√		
CSE4632	Human Computer Interaction			√		√		√		√	√	√	√	
CSE4633	Theory of Computing						√			√				
CSE4634	Image Processing	√			√		√	√		√	√	√	√	
CSE464a	Artificial Intelligence				√		√	√		√	√	√	√	

ECE465	Information Theory and Coding						√							
ECE466	Digital Signal Processing				√		√			√	√	√	√	
ESE551	Electrical Energy Conversion								√					
ECE552	Mobile Communication Systems	√	√		√	√		√		√	√	√	√	√
CSE5531	Web Design Concepts		√		√		√	√			√		√	
CSE5532	Database Theory		√											
CSE5533	Speech Signal Processing						√			√	√	√	√	
CSE5534	Special Topics in Electronics			√				√	√					
CSE554	Grad. Project I	√	√	√	√	√	√	√	√	√	√	√	√	√
ECE561	VLSI			√	√			√	√	√		√	√	
HUM562	Ethics, Safety and Health					√								
CSE5631	Spread Spectrum Techniques				√									
CSE5632	Neutral Networks				√		√	√		√		√	√	√
CSE5633	Compiler Design		√		√			√		√		√	√	
CSE5634	Special Topics Computer Engineering		√							√				
CSE5635	Advanced Artificial Intelligence				√		√	√		√		√	√	√
CSE5636	Advanced Topics in Computer Engineering		√		√					√				
CSE564	Grad. Project II	√	√	√	√	√	√	√	√	√	√	√	√	√

Code	Course Title	Transferable Skills											
		D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12
MAT151	Calculus I	√	√										
BSC152	Engineering physics I	√		√									
GSE153	Engineering mechanics I	√		√									
GSE154n	Engineering Drawing		√										√
COM155	Information Technology				√								
ENG156	Ac. English Writing				√								
MAT161	Calculus II	√	√										
BSC162	Engineering Physics II	√		√									
GSE163	Engineering Mechanics II	√		√									
BSC164	Chemistry	√		√			√						√
GSE165	Workshop Technology	√	√	√		√	√						√
ENG166	Tech. English Writing				√								√
MAT251	Linear Algebra	√	√										
BSC252	Modern Physics	√		√									
ESE253	Electric Circuit Analysis I			√			√						√
ECE254	Digital Design I	√	√	√		√	√	√			√		√
COM255	Computer Program. I			√	√								√
ENG256	Res. English Writing				√								
MAT261	Differential Equations		√	√									
ESE262	Physics of Electrical Materials	√		√									
ESE263	Electric Circuit Analysis II			√			√						√
ECE264	Digital Design II	√	√	√		√	√	√					√
COM265	Computer Program. II			√	√		√				√		√
HUM266	Project Managem. Syst.		√	√		√	√	√			√		√
MAT351	Mathematical analysis	√	√										
CSE352	Microprocessor Systems	√		√			√			√	√	√	√
ECE353	Electronic Circuit Analysis I	√	√				√				√		

CSE354	Algorithms and Data Structure				√			√		√			
ECE355	Data Communication				√								√
ECE356	Electronic Measurements Instruments	√					√	√					√
MAT361	Probability and Statics	√	√	√									
CSE362	Digital Syst. Interfacing	√	√	√		√	√	√			√	√	√
ECE363	Electronic Circuits Analysis II	√	√				√				√		
CSE364	Operating Systems				√	√							√
ECE365	Linear Systems		√										
CSE366	Computer Networks	√	√		√	√	√	√	√	√			√
CSE451	Object-Oriented Program.				√								√
CSE452	Software Engineering				√								√
CSE4531	Industrial Electronics	√						√		√			√
CSE4532	Advanced Operating Syst.				√				√				√
CSE4533	Robot Dynamics and Control	√				√	√		√	√			√
CSE4534	File Access and Management				√		√						√
CSE454	System Analysis and Design							√	√	√			√
ECE455	Automatic Control Syst.	√											√
CSE456	Computer Architecture	√		√			√			√			√
CSE461	Computer Security				√		√		√	√			√
CSE462a	Database Design	√		√	√	√	√		√	√			√
CSE4631	Cryptography							√		√			√
CSE4632	Human Computer Interaction				√			√					√
CSE4633	Theory of Computing												√
CSE4634	Image Processing				√			√		√			√
CSE464a	Artificial Intelligence				√			√		√			√
ECE465	Information Theory and Coding												√
ECE466	Digital Signal Processing												√
ESE551	Electrical Energy Conversion						√	√		√			√
ECE552	Mobile Communication Systems	√						√		√			√
CSE5531	Web Design Concepts	√		√	√	√	√	√	√		√		√
CSE5532	Database Theory				√								
CSE5533	Speech Signal Processing			√				√		√			
CSE5534	Special Topics in Electronics						√	√		√			√

CSE554	Grad. Project I	√	√	√	√	√	√	√	√	√	√	√	√
ECE561	VLSI	√					√	√		√	√		√
HUM562	Ethics, Safety and Health							√		√			√
CSE5631	Spread Spectrum Techniques							√					
CSE5632	Neutral Networks	√			√		√	√		√	√		√
CSE5633	Compiler Design	√			√	√	√	√		√	√		
CSE5634	Special Topics Computer Engineering			√			√	√			√		√
CSE5635	Advanced Artificial Intelligence	√			√		√	√		√	√		√
CSE5636	Advanced Topics in Computer Engineering			√			√	√			√		√
CSE564	Grad. Project II	√	√	√	√	√	√	√	√	√	√	√	√

6.5 Mapping of Graduate Attributes to the Programme Learning Outcomes

The following tables illustrate the mapping of attributes to the programme learning outcomes.

Graduate Attributes	**Knowledge Understanding**																	
	A1	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**	**A8**	**A9**	**A10**	**A11**	**A12**	**A13**	**A14**	**A15**	**A16**	**A17**	**A18**
a	√		√		√													
b											√			√				
c					√													
d		√						√							√	√		
e						√						√	√					
f				√														
g										√								
h						√						√	√					
i						√						√	√					
j							√		√						√	√	√	√

Graduate Attributes	Intellectual Skills												
	B1	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**	**B10**	**B11**	**B12**	**B13**
a	√												
b				√		√	√						
c			√	√	√								
d		√											√
e									√	√			
f								√					
g										√			
h									√	√			
i									√	√			
j											√	√	√

Graduate Attributes	Practical Skills												
	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13
a			√				√						
b	√							√					√
c		√							√				
d	√			√		√				√	√	√	
e					√								
f			√				√						
g					√								
h					√								
i					√								
j													√

Graduate Attributes	Transferable Skills											
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12
a			√									
b									√			
c				√								
d				√								
e	√	√	√		√	√	√	√		√	√	
f			√									
g												√
h	√	√	√		√	√	√	√		√	√	
i	√	√	√		√	√	√	√		√	√	
j						√						