October University for Modern Sciences and Arts (MSA)

Faculty of Engineering

Electrical Communication and Electronic Systems Engineering Program (ECE)

Module Outlines

2014/2015

Module Outlines:

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

All course 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 QAA, the course 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

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 Ttrigonometric Functions.
The Derivative – Techniques of Differentiation – Derivative of Trignometric 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

Knowledge

After completing this module, students will be able to:

1. Define and enumerate the basic concepts and principles of mathematics.
2. Recall the foundations of Calculus Problems and Techniques.
3. Review the various modern techniques, used in mathematical problems.

Skills

After completing this module, students will be able to:

1. Solve engineering problems by suitable mathematical techniquies.
2. Recognize the various mathematical terminology.
3. Develop mathematical skills through tackling and solving engineering problems.

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

Learning Unit Contact Hours Per Week

• Lectures	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 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 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
Scalar and Vector Quantities
Uniform circular motion, Force, work, energy and power
Oscillations and wave motion
Elastic properties of matter
Pressure in fluids
Fluid statics – Pascal's and Archimedes' principles
Fluid dynamics – Equation of continuity and Bernoulli's equation
Viscous flow
Thermal expansion of solids and liquids
Heat and thermal energy – Heat and work
The first law of thermodynamics
Heat transfer
Kinetic theory of gases

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Define the basic concepts, principles and theories of physics.
2. Understand the relationship between theory and experimentation.
3. Classify scientific factors affecting the results.

Skills

After completing this module, students will be able to:

1. Communicate effectively, particularly to the scientific community using the language of physics and mathematics.
2. Solve problems related to real life phenomena.
3. Use laboratory equipment in a safe and effective.
4. Implement projects to emphasize concepts addressed in the course.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Projects

Learning Materials

Hardware Requirements:

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

Reference Texts:

- Hafez A. Radi, *General Physics for Engineers and Scientists*, MSA Univ., Vol. I, 2 nd ed., 2008.
- Hafez A. Radi, *Laboratory Manual of Physics I*, MSA Univ., 2008.

Supplementary Readings:

- Raymond A. Serway, John W. Jewett, "*Physics for Scientists and Engineers with Modern Physics*", Brooks Cole; 7th edition, 2007.
- David Halliday, Robert Resnick, Jearl Walker, "*Fundamentals of Physics*", Wiley, 7th edition, 2004.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 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 students with perspective on engineering mechanics and statics, such as statics of particles, forces, vectors, rectangular components in a plane and in space. This incudes vectors operations, and equilibrium of particle.

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 Centriods and Center of Gravity.
3-D Centriods and Center of Gravity.
2-D Moment of Inertia.
3-D Moment of Inertia.
Real Case Studies.

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Interpret the concepts of engineering mechanics and statics, and their applications.
2. Classify the mechanical processes including the structure design and their different components.

Skills

After completing this module, students will be able to:

1. Solve engineering mechanics and statics problems.
2. Apply the theory of Mechanics to structure design.

Teaching/Learning Strategies

- **Lectures**
- **Tutorials**
- **Individual/Group Projects**

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:

- Meriam, J. L. and Kraige, L. G., Engineering Mechanics (Statics and Dynamics), John Wiley Inc., 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSAUNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

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

AIMS

This module is designed to provide freshmen students with an overview of engineering graphics. 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

After completing this module, students will be able to:

1. Understand the fundamentals of engineering graphics.
2. Develop various technical drawings with necessary views and dimensions.
3. Enlarge students' imagination capability in understanding the mechanical drawings.
4. Understand various types of engineering component connections.
5. Identify detail parts of an assembly, then draw the assembled parts and make the required sections in the assembly.
6. Choose the type of fit between the mating parts, and calculate the allowances and tolerances for the assembled parts as needed.

B - Skills

After completing this module, students will be able to:

1. Develop skills in visualizing the various views of mechanical parts.
2. Apply skills in assembling various mechanical parts.
3. Learn the dimensional tolerances, fits, and surface finish.
4. Develop Constructional Drawings.

Teaching/Learning Strategies

- Design studio.
- Auto CAD Lab.

Learning Materials

Hardware Requirements:

- Various manual drawing tools.
- PC & 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 Graphics, 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 (10 Home Assignments).
- Class Tests (2 1.5-hr. 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	20%
• Unseen Final Exam	40%

Total	**100%**	
Learning Unit Contact Hours		GSE154
• Studio & Lab Wor	4.5	hrs / week
• Lectures	1.5 hrs / week	
• Total studio & Lab contact hours	84	hrs/semester
• Total self work hours	60	hrs/semester
• Total work hours	144	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 students with efficient use of computers, devices and their applications. The lecture part serves as an introduction to computer terminology, graphics and networks. The course introduces common software concepts, operating systems and programming languages. The tutorial part of this course should improve keyboarding skills. It introduces the microcomputer platform with emphasis on windows environment, popular computer application packages, such as Microsoft Office, Working with the internet, AUTOCAD and MATLAB.

SYLLABUS

Topics
Computers Architecture
Central Processing Unit
Memory and Storage Devices
Input and Output Devices
Introduction to Mat lab and AutoCAD
Programming techniques including flow charts and languages
Internet and searching methods
Software operating systems and tools

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Identify the basic concepts of computers
2. Navigate, browse and search the internet.
3. Describe basic components of Autocad and Matlab.

Skill

After completing this module, students will be able to:

1. Employ software operating systems, tools, and applications
2. Organize and retrieve information on a computer.

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 & 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 & Bartlett Pub, 2002.
- Turban, E., R. K. Rainer Jr., R. E. Potter, Introduction to Information Technology, John Wiley & Sons, 2nd ed., 2002.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	1.5 hrs / week
• Laboratories	3 hrs / week
• Total class contact	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 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 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
Writing: 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

Learning Outcomes

Knowledge

After completing this module, students will be able to:

1. Demonstrate in the writing, a clear knowledge of the subject, awareness of the reader, appropriate organization, correct use of punctuation, style and coherence.
2. Analyze and criticize the style and organization of different texts.
3. Provide an understanding of specialized vocabulary in context.

Skills

After completing this module, students will be able to:

1. Write effective five-paragraph essays.
2. Apply multi-draft writing which involves revision and editing of their essays.
3. Correct earlier drafts using the feedback and the correction codes provided by the instructor.
4. Master writing effective summaries focusing on main ideas.
5. Master specialized vocabulary pertaining to pharmaceutical sciences.

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

- Assignments and quizzes.
- Individual term project.
- Unseen Mid-Term Exam.
- Unseen Final-Exam.

Assessment Pattern

Assignments and quizzes	20%
Individual term project.	20%
Unseen Mid-Term Exam	20%
Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

Lectures	3	hrs / week
Tutorials	1.5	hrs / week
Total class contact hours	63	hrs / semester
Total self study hours	45	hrs / semester
Total study hours	108	hrs / semester

Module Leader

Staff

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 analyses 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
Double Integrals – Double Integrals in Polar Coordinates – Areas.
Triple Integrals – Triple Integrals in Cylindrical and Spherical Coordinates – Volumes.
Infinite Series – Convergence Tests.

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Recall and enumerate the essential concepts and principles of mathematics.
2. Review the foundations of Calculus Problems and Techniques.
3. Study the various modern techniques used in mathematical problems.

Skills

After completing this module, students will be able to:

1. Solve engineering problems by suitable mathematical techniques.
2. Recognize the various mathematical terminology.
3. Perform integration in different coordinate systems.

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	3	hrs / week
• Tutorials	1.5	hrs / week
• Total class contact hours	63	hrs/semester
• Total self study hours	45	hrs/semester
• Total study hours	108	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 electricity and magnetism, and their applications in the real world. It deals with solving circuits using network reduction method and Kirchhoff's laws. The module also encourages students to perform practical projects in various aspects of physics.

SYLLABUS

Topics
Electric charges and Coulomb's law
Electric fields and electric lines
Gauss's law and its applications
Electric potential energy and electric potentials
Capacitors and dielectrics
Electric currents and DC circuits
Magnetic fields
Magnetic force on a charge
Magnetic field of an electric current
Magnetic induction
Electromagnetic waves - Maxwell's equations
Sound waves
Wave optics

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Understand the basic concepts, principles, and theories underlying electrical and magnetic phenomena.
2. Match the relationship between theory and experimentation.
3. Classify scientific factors affecting the results.

Skills

After completing this module, students will be able to:

1. Communicate effectively, particularly to the scientific community using the language of physics and mathematics.
2. Tackle practical problems scientifically.
3. Handle equipment in a safe and effective manner,
4. Implement projects to emphasize concepts addressed in the course

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Projects

Learning Materials

Hardware Requirements:

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

Reference Texts:

- Hafez A. Radi, *General Physics for Engineers and Scientists*, MSA Univ., Vol. II, 2008.
- Nabila Nowaira, *Laboratory Manual of Physics II*, MSA Univ., 2008.

Supplementary Readings:

- Raymond A. Serway, John W. Jewett, "*Physics for Scientists and Engineers with Modern Physics*", Brooks Cole; 7th edition, 2007.
- David Halliday, Robert Resnick, Jearl Walker, "*Fundamentals of Physics*", Wiley, 7th edition, 2004.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

Staff

MSAUNIVERSITY
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 prespective 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 and 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 Perticle: Force and Acceleration.
Mechanical Vibration.
Kinetics of Particles: Work and Energy.
Circular Motion.
Impulse and Momentum.
Real Case Studies.

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Outline the concepts of engineering mechanics and dynamics.
2. Develop the motion design of mechanisms.
3. Demonstrate the theory of dynamics problems and its applications.

Skills

After completing this module, students will be able to:

1. Solve engineering mechanics and dynamic problems.
2. Apply the theory of dynamics to motion design of mechanisms.
3. Derive the equation of motion of a dynamic system
4. Implement a project by solving dynamic problems of engineering mechanics

Teaching/Learning Strategies

- **Lectures**
- **Tutorials**
- **Individual/Group Projects**

Learning Materials

Useful Websites:

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

Reference Text:

Supplementary Readings:

- Meriam, J. L. and Kraige, L. G., Engineering Mechanics, (Statics and Dynamics), John Wiley Inc., New Eddition.
- Hibbeler, R. C., Engineering Mechanics (Statics and Dynamics), Macmillan Co., 11th ed., 2006.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: BSC 164**
Title	**: Chemistry**
Level	**: 1**
Credit Hours	**: 3**
Prerequisites	**: None**

AIMS

This module is designed to provide students with an understanding of chemical fundamentals of air pollution, water pollution, water treatment, and electrochemistry. Chemical Processes in several industries such as ceramics industry, petroleum industry, cement industry, polymers industry and glass industry.

SYLLABUS

Topics
Air Pollution
Water Pollution
Water Treatment
Electrochemistry
Chemical Processes in Petroleum Industry
Chemical Processes in Cement Industry
Chemical Processes in Polymers Industry
Chemical Processes in Glass Industry
Chemical Processes in Ceramics Industry

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Analyse the chemical processes used in various industries.
2. Understand the basic principles of Petroleum .cement, polymers. glass and ceramics industries.

Skills

After completing the module, students will be able to:

1. Apply skills in various techniques for solving air and water pollution.
2. Demonstrate the electrochemistry phenomena and indicate the characteristics of corrosion.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Projects

Learning Materials

Useful Websites:

- http://www.wiley-vch.de
- http://www.ceic.unsw.edu.au

- http://www.icsnz.com.nz

Reference Texts:

- MSA Staff, Industrial Chemistry , 2009.

Supplementary Readings:

- Steedman, W., Sandden, R.B. and Anderson, I. M., Chemistry for the Engineering and Applied Sciences, Pregamon International Library, Pergamon Press, 1980.
- Brady, J. E. and Holum, J. R., Chemistry, The study of Matter and its Changes, John Wiley Inc., 1996.
- Martin Grayson, Encyclopedia of Glass, Ceramics, and Cement, John Wiley & Sons, Inc., 1985.
- Dara, S. S., Atext Book of Engineering Chemistry, S. Chand & Co. Ltd., 10th ed., 2003.

Assessment Scheme

- Weekly Assignments.
- Tests and Quizzes.
- Projects and Reports.
- Laboratory Final Test.
- Unseen Written Mid-Term Exam.
- Unseen Written Final-Exam.

Assessment Pattern

Assignments	10 %
Tests and Quizzes	10 %
Laboratory Test	10 %
Term Projects and Reports	10 %
Unseen Mid-Term Exam	20 %
Unseen Final Exam	40 %
Total	**100 %**

Learning Unit Contact Hours

• Lectures	3	hrs / week
• Tutorials/lab	3	hrs / week
• Total class contact hours	84	hrs / semester
• Total self study hours	60	hrs / semester
• Total study hours	144	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 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 Furances and Casting Equipment.
Wood working machines and related tools.
Pressing, Blowing, and Extrusion of polymeric machines.

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Recognize various machine tools used in machining and forming processes.
2. Acquire knowledge of the various polymeric machines.
3. Become familiar with industrial health hazards and hygiene, as well as the means of safety precautions.

Skills

After completing this module, students will be able to:

1. operate various machines in the workshop.
2. Develop awareness of hazards, safety, and industrial hygiene at work environment is created.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Workshops.
- 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, reprented 2008.

Supplementary Readings:

- El Wakil, S. D., Processes and Design for Manufacturing, PWS Publishing Company, New Eddition.
-

Assessment Scheme

- Weekly written Assignments (8 Team Reports).
- Short written Quizzes (4 10-min. 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 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	3 hrs / week
Workshops	1.5 hrs / week
Total class contact hours	63 hrs/semester
Total self study hours	45 hrs/semester
Total study hours	108 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 enhance students' formal reports and business proposals writing, notetaking and oral presentation skills. Assist 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

Learning Outcomes

Knowledge

After completing this module, students will be able to:

1. Analyze the texts they need to incorporate in the reports, identify graphical and visual information

Skills

After completing this module, students will be able to:

1. Paraphrase, summarize and analyse the texts they need to incorporate in the reports.
2. Write clear and effective curriculum vitae, business letters and memos.
3. Design and administer questionnaires.
4. Analyze the quantitative and qualitative data obtained from the questionnaires.
5. Integrate graphical, visual and statistical information into the reports.
6. Produce a report with an outline and a simplified "Reference" page.
7. Present the reports using slides or computer software.

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

- Silyn-Roberts, H, Writing for Science, 1996, Longman.

Assessment Scheme

- Assignments, and quizzes.
- Individual term project.
- Unseen Mid-Term Exam.
- Unseen Final-Exam.

Assessment Pattern

• Assignments and Quizzes	20%
• Individual term report	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	1.5	hrs / week
• Tutorials / Lab.	3	hrs / week
• Total class contact hours	63	hrs / semester
• Total self study hours	45	hrs / semester
• Total study hours	108	hrs / semester

Module Leader

Staff

200’s LEVEL MODULES

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: MAT251**
Title	**: Linear Algebra**
Level	**: 2**
Credit Hours	**: 3**
Prerequisites	**: MAT161**

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.
Determinates – Properties of Determinates.
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 – Homogenous 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

Knowledge

After completing this module, students will be able to:

1. Acquire the basic concepts and principles of mathematics.
2. Demonstrate the foundations of Linear Algebra Problems and Techniques.
3. Explore the various modern mathematical techniques used in Linear Algebra problems.

Skills

After completing this module, students will be able to:

1. Solve engineering problems by suitable mathematical techniquies.
2. Recognize the various mathematical terminology.
3. Develop mathematical skills through tackling and solving engineering problems.

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:

- Larson, Edwards and Falvo , Elementary Linear Algebra, 6th ed.- Houghton Mifflin Co.- 2004, Ch. 1-5,7
- Anton, H., and Rorres, C; Elementary Linear Alegbra: Application Version John wiley Inc., 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 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 enable students to understand in depth the special theory of relativity, black body radiation, the photoelectric effect, the Compton Effect, wave properties of a particle, uncertainty principle, Bohr's theory of atom and atomic spectra, quantum mechanical model of the Hydrogen atom, the atomic structure and the periodic table.

SYLLABUS

Topics
Special theory of relativity – The relativity of time and length
Relativistic velocity, mass, momentum and energy
Black Body Radiation
Thermal radiation and Planck's Postulate for energy quantization
Photoelectric effect, X-ray, and Compton effect
Particle like properties of radiation – Photons (Dual Nature of Light)
Wave properties of particles – de Broglie's postulate (Dual Nature of Particles)
Heisenberg's uncertainty principle
Schrödinger's theory of quantum mechanics
Atomic Spectra and early models of atoms
Bohr's model of the Hydrogen atom
The quantum model of the Hydrogen atom
Pauli's Exclusion principle and the periodic table
x-ray spectra
Spontaneous and stimulated transition - Lasers

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Describe the basic concepts of the theory of relativity and quantum mechanics.
2. Illustrate methods of black body radiation and photoelectric effect.
3. List scientific factors affecting the results.

Skills

After completing this module, students will be able to:

1. Communicate effectively, particularly to the scientific community using the language of physics and mathematics.
2. Handle equipment in a safe and effective manner, to measure the wavelength of monochromatic light using Newton's rings and single slit diffraction, the specific rotation of polarized light by sugar solution and the energy gap of a semiconductor.
3. Tackle practical problems scientifically.
4. Implement projects to emphasize concepts addressed in the course.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Projects

Learning Materials

Hardware Requirements:

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

Reference Texts:

- Raymond A. Serway, John W. Jewett, "*Physics for Scientists and Engineers with Modern Physics*", Brooks Cole; 7th edition, 2007.
- MSA Laboratory Manual.

Supplementary Readings:

- Ohanian & Markert, "*Physics for Engineers and Scientists"*, W.W. Norton & Co., 3th ed., 2007.
- Griffith, W.T., "*The Physics of everyday Phenomena*", McGraw Hill Co., 3rd ed., 2001.
- Coletta, U. P., *College physics*, Mosby Inc., 1999.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 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 an introductory topics in the circuit variables & elements, D.C circuits: network reduction, Ohm' Law, Kirchoff's Laws, sources & source transformation, séries / parallel & delta/star combinations, Network theorems: superposition; mesh & node analysis: Thevenin's & Norton's Equivalent circuits, Maximum power transfer, inductors & capacitors, natural & step responses of first order RL & RC circuits.

SYLLABUS

Topics
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 visa 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 Experime
- Capacitors and Inductors
- 1st Order RC and RL Circuits
- 2nd Order RLC

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Describe basic linear electric circuits, theories and concepts.
2. Understand circuit theotrems and laws of circuit analysis

Skills

After completing this module, students will be able to:

1. Use circuit simulators (MULTISIM), matrix solvers (MATLAB) to verify students solutions and validate hand calculations.
2. Construct electrical circuits and Measure their parameters.

Teaching/Learning Strategies

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

Learning Materials

Software Requirements

- MULTISIM and MATLAB.

Useful Websites

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

Reference Text:

- Nilsson, J. W., and Riedel, Electric Circuits, Prentice Hall,8th ed.,2008.

Supplementary Readings:

- IEEE Circuits and Systems Magazine

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 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

Knowledge

After completing this course students well be able to:

1. Recognize the number systems, and the conversion from a system to another
2. Identify the different types of complements and codes
3. Describe the Boolean algebra and its use in simplifying logic expression.
4. Describe the functions of the basic logic gates.
5. Identify the strucure and fnction of different combinational logic circuits.
6. Understand VHDL Programming Methods.

Skills

After completing this course students well be able to:

1. Design logic circuits using different approaches; either basic logic gates, universal logicgates or combinational logic gates
2. Realize the designed circuit using any of the available resources (basic/ universal logic gates, adders, comparators, decoders, encoders, MUXs).
3. Use Boolean Algebra and Karnaugh map methods to simplify combinational logic circuit design.
4. Dvelop programs for PLDs and FPGAs using VHDL.

5. Measure and test different types of combinational circuits.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- 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:

- Thomas L. Floyd, Digital Fundamentals, 10 th 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 (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 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 proces).
C++ Simple Data Types.
Constants and Variables Declaration.
Input and Output Statements (cin and cout).
Output Manipulators.
Assignment Statement Mathematical Expressions.
Automatic Type Conversions and Casting.
Dcision Statements (if and which).
Logical Expressions.
Repetition Statements (for, while and do).
One and Multidimensional Arrays.
String Manipulations.
Built-In Funtions and User-Defined Functions.
Passing Valu and Reference Arguments.
Local and Global Identifiers.

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Design and think in computing wise to develop a program for solving problems.
2. Trace a given program and fix any logical error in the program.
3. Divide the problem into sub-problems.

Skills

After completing this module, students will be able to:

1. Use the VC++ tool professionally to convert logic and design into a computr program.
2. Debug skills using VC++ tool.

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, 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 & 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 & Bartlett Pub, 2002.
- Turban, E., R. K. Rainer Jr., R. E. Potter, Introduction to Information Technology, John Wiley & Sons, 2nd ed., 2002.

Assessment Scheme

- Weekly Computer Assignments
- Short computer Quizzes
- Class computer Tests
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3	hrs / week
Laboratories	1.5	hrs / week
Total class contact hours	63	hrs/semester
Total self study hours	45	hrs/semester
Total study hours	108	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. Emphasize research skills necessary for writing research papers. Provide a survey of different articles on specialized topics and train students on rhetorical awareness beyond traditional composition. Intensive writing practice with a thorough guidance on using references and citing sources.

SYLLABUS

Topics
Introduction and instructions explaining objectives, assignments and grading system: Library Skills and Classification Systems ,Reading: Unit 1
Thesis Statement :Reading: Unit 2
Outlining (Submit research paper outline) : Reading: Unit 3
Summary Writing : Reading: Unit 4
Organization Analysis : Application of Summary Writing (Source I) , APA in-text citations
Organization Analysis : Application of Summary Writing (Source II) , Reading: Unit 5
Fallacies : Reading: Unit 6
Fallacies (Cont.) : Reading: Unit 7
APA Style Sheet : Application of Summary Writing (Source III)
APA Style Sheet (Cont.) : Application of Summary Writing (Source IV) , Reading: Unit 8
Application of Summary Writing (Source V) : Submitting Research Paper and Giving Oral Presentations

Learning Outcomes

Knowledge

After completing this module, students will be able to:

1. Analyze different texts to identify thesis statements and developmental functions of those texts.
2. Identify fallacies in the texts they analyze.
3. Identify different library classification systems and card catalogs

Skills

After completing this module, students will be able to:

1. Write outlines and summaries.
2. Develop logical arguments.
3. Identify key elements of problems and choose appropriate methods for the resolution in a considered manner.
4. Write a research paper using correct in-text citations according to the APA style.

5. Prepare in the research paper a complete "Reference" page, prepared according to the APA style.
6. Present the papers using slides or computer software.

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

- Anderson, J.Poole, M., H, Assignment & Thesis Writing (4th edition), 2002, Wiley.

Assessment Scheme

- Assignments and quizzes.
- Individual term project.
- Unseen Mid-Term Exam.
- Unseen Final-Exam.

Assessment Pattern

• Assignments and quizzes	20%
• Individual term report	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours

• Lectures	3	hrs / week
• Tutorials	1.5	hrs / week
• Total class contact hours	63	hrs / semester
• Total self study hours	45	hrs / semester
• Total study hours	108	hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: MAT261**
Title	**: Differential Equations**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: MAT161**

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 DifferentialEquations 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

Knowledge

After completing this module, students will be able to:

1. Recognize the various mathematical terminology.
2. Capture the basic concepts and principles of mathematics.
3. Apply Differential Equations Solving Techniques.
4. Employ the various modern mathematical techniques.

Skills

After completing this module, students will be able to:

1. Solve engineering problems by suitable mathematical techniquies.
2. Develop mathematical skills through tackling and solving engineering problems.

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Software Requirements:

- MAPLE, DRIVE, MATHEMATICA, MATLAB

Useful Websites:

- www.wikipedia.org
- 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.
- Jost, J., Partial Differential Equation., Springer Verlag new eddition.
- Blanchard, P., Differential Equations, Brooks Cole, 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 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, Paramagnetism 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
Paramagnetism and its Materials
Ferromagnetism
Superconductivity and Magnetic Fields
Perfect Diamagnetism
Electrodynamics of Superconductivity

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Describe properties of dielectrics.
2. Identify magnetic materials.
3. Distinguish between superconductor materials at microscopic and macroscopic levels.

Skills

1. Select the proper material for specific application.
2. Evaluate the performance of electrical materials.

Teaching/Learning Strategies

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

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.

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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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

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MODULE OUTLINE

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

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 equivalent circuit, 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
Reasomance: 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 oscilliscope .
- Resistive elements in AC circuits
- Inductive elements in AC circuits
- Capacitive elements in AC circuits
- Resonant circuits
- Filters : output voltage-time charactersitic

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Understand the behavior of linear circuit elements in AC circuit
2. Recognize differences in response between inductive and capacitive circuits.

3. Gain real-world engineering experience in circuit analysis.

Skills

After completing this course students will be able to:

1. Identify relationship between conceptual understanding and problem-solving approaches.
2. Analyze electric circuits supplied by different AC sources
3. Design simple passive filters

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Team projects

Learning Materials

Software Requirements

- P Spice & MULTISIM

Useful Websites

- http://www.analyzethat.net

Reference Text:

- Nilsson, J. W., Riedel, S. A., Electric Circuits, Prentice–Hall,7th edition

Supplementary Readings:

- IEEE Circuits and Systems Magazine

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

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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.

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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

Knowledge

After completing this course students well be able to:

1. Recognize the structures and functions of Latches, Flip-Flops, Multivibrators,
   Counters, Registers, and Memories.
2. Identify the characteristics of Synchronous and Asynchronous Sequential Circuits.
3. Acquire knowledge associated with the different types of Integrated Circuits .
4. Measure and test different types of sequential logic circuits

Skills

After completing this course students well be able to:

1. Design sequential logic circuits using different approaches
2. Realize the designed circuit using any of the available resources/devices.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- 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 (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 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 Structres.
Pointers.
Classes Usage and Declaring.
Objects as Function Arguments.
Operator Overloading.
Inheritance.

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Learn how to be a team member or a team-leader in a medim-size/large project.
2. Differentiate between static and dynamic allocation, and which one to choose.

Skills

After completing this module, students will be able to:

1. Use VC++ tool professionally in developing a large project.
2. Design and analyze a large problem in object-oriented methodoldogies (OOP).

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 & 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 & Bartlett Pub, 2002.
- Turban, E., R. K. Rainer Jr., R. E. Potter, Introduction to Information Technology, John Wiley & Sons, 2nd ed., 2002.

Assessment Scheme

- Weekly Computer Assignments (8 individual laboratory assignments).
- Short computer Quizzes (2 1.5-hr. Quizzes, one in OPP before Final).
- Class computer Tests (2 1.5-hr. Tests).
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code **: SOC 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 pass 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 & leveling.
Time-Cost Trade-Off & Crashing.
Real Case Study.

LEARNING OUTCOMES

A- Knowledge

After completing this module, students will be able to:

1. Review the basic concepts and principles of project management.
2. Develop an in-depth understanding of the three phases of project management: planning phase, scheduling phase, and control phase.

B- Skills

After completing this module, students will be able to:

1. 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.

2. Plan an analysis of the project managemenet phases through real case studies.

3. Planning to communicate potentialities and strategies for resolving issues which occur during the project.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Individual Project.
- 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., 3rd ed., 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 (12 Home Assignments).
- Short written Quizzes (4 10-min. Quizzes).
- Class written Tests (2 1.5-hr. Tests).
- Individual Projects.
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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
Tutorials	1.5	hrs / week
Total class contact hours	63	hrs/semester
Total self study hours	45	hrs/semester
Total study hours	108	hrs/semester

Module Leader

Staff

300’s LEVEL MODULES

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: MAT351**
Title	**: Mathematical Analysis and Numerical Methods**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: MAT261**

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

Knowledge

After completing this module, students will be able to:

1. Manipulate various methods of Numerical Analysis Problems and Techniques.
2. Capture various modern mathematical techniques.

Skills

After completing this module, students will be able to:

1. Apply the basic concepts and principles of Fourier and Laplace Transforms.
2. Solve engineering problems by suitable mathematical techniquies.
3. Develop mathematical skills through tackling and solving engineering problems.

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Software Requirements:

- MAPLE, DRIVE, MATHEMATICA, MATLAB.

Useful Websites:

- www.cs.laurentian.ca
- www.math.jbpub.com

- www.ma.utexas.edu
- www.cl.cam.ac.uk

Reference Text:

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

Supplementary Readings:

- Chapra, S.C. & Canole, R.P. Numerical Methods for Engineers, McGraw Hill, 1998.
- Chaney, W. and Kincaid, D., Numerical Mathematics and Computing, Brooks, Cole Publishing Co., 1996.

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

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FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	: **CSE** 352
Title	: **Micropocessor Systems**
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

Knowledge

After completing this course students will be able to:

1. Illustrate the basic hardware and software concepts of microprocessors.
2. Differentiate between the microprocessor-based systems .

Skills

After completing this course students will be able to:

1. Implement microprocessor-based applications.
2. Compose assembly language programs .

Teaching/Learning Strategies

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

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

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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 the physics. It includes theory of operation of the P-N junction, bipolar junction and field effect transistors.

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 ofField Effect Transistors(FET) Transistors, characteristics, operation, analysis of different configurations and applications.

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Understand the basic physics of Semiconductors.
2. Illustrate diode , BJT, and FET transistors DC operations

Skills

After completing this course students well be able to:

1. Differnetiate between different types of semiconductor materials .
2. Solve the DC problems for BJT and MOS transistors.
3. Measure and Test different electronic circuits.

Teaching/Learning Strategies

- Lectures.
- Laboratories.
- Tutorials.
- Group Project / Term Paper.

Learning Materials

Useful Websites

- http://www.web-ee.com

Reference Text:

- Thomas L. Floyed, Electronic Devices, Pearson Prentics Hall, 7th edition, 2005, ISBN: 0-13-127827-4

Supplementary Readings:

- IEEE Circuits and Systems Magazine.
- Yang, E. S., Microelectronic Devices, MH, 1988.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

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MODULE OUTLINE

Module Code	: **ECE 354**
Title	: **Electromagnetic I**
Level	: **3**
Credit Hours	: **3**
Prerequisites	: **MAT251**

AIMS

This module is designed to enable students to comprehend basic concepts of Electromagnetic fields, such as vector analysis, different coordinate systems and their operators, coulomb's law and gauss's law and their applications, …etc.

SYLLABUS

Topics
Electromagnetic Model
Vector Analysis
Coordinate Systems and Operators
Coulomb's Law
Gauss's Law and Applications
Electric Potential
Electric Flux Density
Boundary Conditions for Electrostatic Fields
Capacitance and Capacitors
Electrostatic Energy and Forces
Method of Images
Boundary–Value Problems
Biot–Savart Law and Applications
Ampere's Law and Applications
Magnetic Vector and Scalar Potential

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Characterize Electromagnetic models.
2. Comprehend basic concepts of Electromagnetic fields.

Skills

After completing this course students well be able to:

1. Demonstrate the various applications based on static electromagnetism.
2. Solve electromagnetic fields problems.
3. Analyze the solutions of many static problems.

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Useful Websites

- http://www.electromagnetics.co.uk

Reference Text:

- Electromagnetics engineering,william Hayt, 5th eddition 2000.

Supplementary Readings:

- IEEE Magnetics Magazine.
- Collin, R. E., Foundation of Microwave Engineering, McGrraw Hill Book Co., New York, 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

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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

Knowledge

After completing this course students will be able to:

1. Analyze data communication and computer networks , both from theoretical and practaical aspects .
2. Differentiate differnent protocols, standards, network configuration and topologies

Skills

After completing this course students will be able to

1. Design communication and data networks .
2. Differentiate modes of communication.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Class Presentations.

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 (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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUNLINE

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

AIMS

This module is designed to enable students to understand concepts in electrical and electronic measurements. It introduces students to static and dynamic characteristics, accuracy and measurement error, statistical analysis of errors, electrical units, various classes of standard functions and characteristics of instruments. In addition, it presents different methods of measurements, classification of instruments, electrical measurements of basic parameters, direct current and voltage, alternating current and voltage, power, energy, power factor, and frequency. It also presents D.C and A.C Bridge measurements, Instrument transformers, current and voltage transformers, Electronic Instruments, Digital Instruments, Display devices and Recorders, Function Generators, Oscilloscopes, Calibration instruments, Sensors, and Transducers.

SYLLABUS

TOPICS
Units and Standards of measures
Measurement and Instrumentation; sensing elements, signal conditioning elements, signal processing elements and data presentation elements
Static and Dynamic characteristics
Errors in measurements ,Statistical analysis , average, standard deviation
Electromechanical Instruments, permanent magnet, moving coil, and moving iron
Instrument Transformers, current and voltage transformer
D.C. and A.C. Bridge Instruments; theory , operation and application
Electronic Instruments
Digital Instruments
Display devices and Recorders
Sine Wave Generators
Oscilloscopes
Calibration Instruments
Sensors and Transducers; temperature, position, force , torque, and pressure systems

LEARNING OUTCOMES

Knowledge

After completing this course, students will be able to:

1. Define units and standards of measures
2. Understand basic concepts and techniques of measuring physical, electrical and electronic quantities
3. Distinguish between the different types of Instruments.

Skills

After completing this course, students will be able to:

1. Utilize the basics of laboratory instrumentations
2. Analyze errors in measurement to avoid it
3. Measure different physical, electrical and electronic quantities

TEACHING / LEARNING STRATEGIES

- Lectures
- Tutorials/Labs
- Team projects / paper
- Class Presentation

LEARNING MATERIALS

Reference Text:

- David A. Bell " Electronic Instrumentation And Measurements" Prentice-Hall of India, New Delhi, 2005

Supplementary Readings:

- IEEE Electron Devices Magazine 2000 up to 2013
- R.K.Rajput " Electronic Measurements and Instrumentation" S.Chand Company LtD. New Delhi-2008
- J.B.Gupta " Advanced Measurements and Instrumentation" S.K.Kataria & sons, 2005
- M.M.S.Anand " Electronic Instruments and Instrumentation technology" PHI learning, 2004

Useful Websites

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

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
Tutorials	1.5 hrs / week
Laboratories	1.5 hrs / week
Total class contact	84 hrs/semester
Total self study hours	60 hrs/semester
Total study hours	144 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: MAT361**
Title	**: Probability and Statistics**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: MAT351**

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 & Poisson
Continious Propability Distributions: Uniform, Exponential & Normal.
Sampling Distribution.
Random processes and cross correlation
Confidence Limits & Confidence Interval.
Significance Testing Hypotheses: X^2-test & Goodness of Fit Test.
Correlation : Measurement, & Coefficients.
Regression Analysis and Least Squares Method.

LEARNING OUTCOMES

Knowledge

After completing this module, students will be able to:

1. Incorporate the role that statistics can play in the engineering problem – solving process.
2. Prescribe the importance of using statistical techniques to make decesions.
3. Rate the various probability and statistical terminology.
4. Integrate the basic rules of probabilities.
5. Assess random and stochastic processes.

Skills

After completing this module, students will be able to:

1. Determine probabilities from Cumulative Distribution Functions (CDF) and CDF from Probability Density Functions (PDF), and the reverse.
2. Develp statistical skills through tackling and solving engineering problems.
3. Calculate probabilities means, and variances for each discrete and continuous probability distributions.
4. Gain statistical skills in the presentation of data, analysis of data, and testing the hypothesis.

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

Supplementary Readings:

- Johnson, R. A. and Bhattacharyya, G. K., Statistics: Principales and Methods, John wiley Inc., 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
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• Total study hours	108 hrs/semester

Module Leader

Staff

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FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: CSE362**
Title	: Digital System Interface
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 architectues, 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

Knowledge

After completing this course students will be able to:

1. Acquire data and knowledge needed for Digital System Interfacing
2. Understand different types of interfacing and microcontrollers
3. Differentiate between microprocessor-based systems and microcontroller-based systems.
4. Identify the need to develop an embedded software system.

Skills

After completing this course students will be able to:

1. Design and Implement Microcontroller-based systems needed for real life applications.
2. Design and conduct experiments to validate and verify the functionality of the developed systems.
3. Gather and evaluate the experimental results

4. Propose enhancements for the designed systems

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- 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 (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. Exam).

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
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• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	3 hrs / week
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• Total study hours	144 hrs/semester

Module Leader

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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 diodes, bipolar junction transistors (BJT) and field effect transistors (FET). The introduced circuits include: BJT single stage Amplifiers, MOS single stage Amplifiers, and Multistage Amplifiers..

SYLLABUS

Topics
Introduction.
BJT Frequency Response.
BJT Singal 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 Drin and Common Gate.
3-Current Mirror.

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Understand the basic characteristics and operating points of different solid state components.
2. Ilustrate the strctures and functions of solid state circuits

Skills

After completing this course students well be able to:

1. Design and implement electronic circuits with different sold state components.

2. Measure and test various electronic circuits.
3. Draw and analyze the frequency response of various electronic circuits.

Teaching/Learning Strategies

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

Learning Materials

Useful Websites

- http://www.web-ee.com

Reference Text:

- Thomas L. Floyed, Electronic Devices, Pearson Prentics Hall, 7th edition, 2005, ISBN: 0-13-127827-4

Supplementary Readings:

- IEEE Circuits and Systems Magazine.
- Yang, E. S., Microelectronic Devices, MH, 1988.

Assessment Scheme

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

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
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Total	**100%**

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• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
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• Total study hours	144 hrs/semester

Module Leader

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MODULE OUTLINE

Module Code	**: ECE 364**
Title	**: Electromagnetics II**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: ECE 354**

AIMS

This module is designed to give students an in depth coverage of the electromagnetic concepts and theories, such as critical angle of incidence and surface waves, different forms of Maxwell's Equations, boundary conditions,…etc.

SYLLABUS

Topics
Faraday's Law of Electromagnetic Induction
Maxwell's Equations: Integral and differential forms
Electromagnetic boundary condition
Time harmonic fields
Propagation of Electromagnetic Waves
Uniform plane waves and Non-uniform plane waves
Transverse electromagnetic waves
Electromagnetic power and pointing vector
Polarization of TEM Waves
Wave Propagation in Different Media
Reflection and Refraction of Plane Waves
Normal incidence of plane waves
Oblique incidence of plane waves
Brewster angle of incidence
Critical angle of incidence and Surface waves
Types of Transmission lines, Wave Propagation in Transmission Lines.
Waves on an Ideal Transmission Line
Terminated Transmission Lines: Resistive Load
Terminated Transmission Lines: Capacitive Load
Waves on a Lossy Transmission Line
Classification of Wave Solution
Smith Chart
Impedance Matching
Single – Stub Matching/ Double-Stub Matching

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Differntiate between different propagating media.
2. Apply Maxwell's equations to find the electric and magnetic field components in different media.

Skills

After completing this course students well be able to:

1. Analyze the optimum performance for transmission lines.
2. Determine the perfect communication link

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Useful Websites

- http://www.emlib.jpl.nasa.gov
- http://www.ccem.uiuc.edu

Reference Text:

- Electromagnetics engineering,william Hayt, 5th eddition 2000.

Supplementary Readings:

- IEEE electromagnetic compatibility magazine.2002-2009
- Field and Wave Electromagnetics,David K. Cheng,Addison Wesley,1989.

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ECE 365**
Title	**: Linear Systems**
Level	**: 3**
Credit Hours	**: 3**
Prerequisites	**: ESE 263+MAT 351**

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 signals and systems
Signal operations
Properties of linear systems
System response
Classical solutions of differential equations
Continuous and discrete convolution
Time-domain model of systems: differential equations-transfer function – state space equations
Fourier series and Fourier transforms: trigonometric – exponential-spectral contents-properties- application to modulation and demodulation
Fourier analysis of continuous-time systems: response of periodic and aperiodic inputs-analysis of ideal filters
The Laplace transform and transfer function representation: properties- Computation of the Inverse Laplace Transform - Transform of the Input/Output Differential Equation- response to step and sinusoidal inputs - Causal Filters

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Understand the main concepts of signals and linear systems.
2. Know the useful analysis tools used with linear systems.

Skills

After completing this course students will be able to:

1. Apply the concepts of signals and systems in the fields of circuit analysis and communication.
2. Use Matlab to solve linear systems problems.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Software practice.
- Team Paper.

Learning Materials

Useful Websites

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

Reference Text:

- B.P. Lathi, Signal processing and linear systems, Berkeley Cambridge Press, 2000

Supplementary Readings:

- IEEE Signal Processing Magazine.
- Steven T. Karris, Signals and Systems: with Matlab Applications, Orchard Publications, 2nd edition, 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/Assignments	20%
• Tests and Quizzes	20%
• Unseen Mid-Term Exam	20%
• Unseen Final Exam	40%
Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 366**
Title	**: Communication 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

Topics
Introduction to Networks: Network Services, Network Topologies, Circuit Switching and Packet Switching.
Computer Networks: Layered Architecture- Concept of Layering, OSI Model.
The Physical Layer: Digital Transmission Fundamentals, Transmission Media, Devices and Components.
The Data Link Layer (DLC) : Error Control, ARQ, Framing - Medium Access Control Protocols - ALOHA, CSMA, LANs.
Packet Switching & the Network Layer : Datagram and Virtual Circuit Switching, Network Layer Functions, Routing Algorithms
ATM and TCP/IP Networks
Telephone Networks: Network Elements, Multiplexing, Switching, Signaling, Traffic Analysis, Cellular Networks

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Acquire all basic characteristics of computer networks.
2. Illustrate the organization and structure of modern-day computer networks.

Skills

After completing this course students well be able to:

1. Design an efficient network protocol and compare between line and “air” technologies
2. Practice critical thinking and problem solving in computer networks.
3. Practice in technical writing skills.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

Learning Materials

Useful Websites

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

Reference Text:

- Leon-Garcia and Widjaja , "Communication Networks", Second Edition, by, McGraw Hill.

Supplementary Readings:

- Andrew S. Tanenbaum ,"Computer Networks ", (4th edition), by, Prentice Hall.

3. Design an efficient network protocol and compare between line and "air" technologies

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

400’s LEVEL MODULES

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ECE 451**
Title	**: Electronic Circuits Analysis III**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE363**

AIMS

This module is designed to enable students to understand concepts in the electronic amplifier theory, MOSFET amplifiers, frequency response, power amplifiers, tuned voltage amplifiers, feed back amplifiers, sinusoidal oscillators, and operational amplifiers.

SYLLABUS

Topics
Introduction To Analog Design.
Differential Amplifiers.
Noise Types Analysis In MOS Amplifier .
Power/Voltage Amplifiers.
Feedback.
Operational Amplifiers
Sinusoidal Oscillators.

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Illustrate the modern analog design techniques
2. Examine the noise analysis in MOS amplifiers.
3. Understand the characteristics and operating conditions of sold state amplifiers and oscillators..

Skills

After completing this course students well be able to

1. Design and implement different amplifier and oscillators circuits.
2. Test different amplifier and oscillators circuits.
3. Measure and analyze analog signals
4.

Lab Experiments

1- Frequency response of the differential amplifier
2- MOS Amplifiers
3- RC oscillator (Wien Bridge).

Teaching/Learning Strategies

- Lectures.
- Laboratories.
- Tutorials.
- Team projects/Term paper.

Learning Materials

Useful Websites

- http://www.electronic-circuits-diagrams.com
- http://www.aeri.com/ics

Reference Text:

- Thomas L. Floyed, Electronic Devices, Pearson Prentics Hall, 7th edition, 2005, ISBN: 0-13-127827-4

Supplementary Readings:

- IEEE consumer electronics magazine.
- Mitchell, F.H.,Introduction to Electronic Design, Prentice Hall, Englewood Cliffs,Jersy Latest Ed.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

Staff

MSA UNIVERSITY

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MODULE OUTLINE

Module Code	**: ECE 452**
Title	**: Communication Systems I**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 365**

AIMS

This module is designed to enable students to utilize the Fourier analysis of signals, analysis of the continuous wave (CW) modulation techniques (AM, DSB-SC, QAM, SSB, VSB, FM and PM) and their applications, mathematical description and spectral analysis of AM, FM, and PM signals. This module also introduces the basics of digital transmission using PCM and Delta modulation.

SYLLABUS

Topics
Analysis of signals: Analysis of power and energy signals - Principles of signals orthogonality- Fourier series of periodic signals -Parsevals theorem, power and energy spectral densities - Fourier transform of non-periodic signals and its properties Signal transmission and distortion through linear systems - Analysis of system frequency response
Linear Modulation: Amplitude Modulation (AM) DSB−TC - Generation of (AM) DSB−TC Detection of (AM) DSB−TC - Amplitude Modulation of DSB−SC - Generation of (AM) DSB−SC - Detection of (AM) DSB−SC - Quadrature Amplitude Modulation (QAM) - Amplitude Modulation of SSB−SC - Generation and Detection of AM SSB−SC
Angle Modulation and other modulation methods: Vestigial side band Modulation (VSB) and FDM - Angle Modulation FM and PM - FM narrow band and wide band - Generation of FM
Sampling theorem, PCM system and Delta modulation.

LAB EXPERIMENTS

- RF oscillators
- Second – order filter
- AM Modulators
- AM Demodulators

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Identify spectral attributes of electrical signals
2. Understand the basic fundamentals of the amplitude modulation
3. Distinguish the basic fundamentals of the phase and frequency modulation

Skills

After completing this course students will be able to:

1. Analyze electrical signals in time and frequency domain

2. Examine the analog modulation techniques
3. Analyze analog modulation schemes.
4. Operate basic transmitter and receiver equipment.

Teaching/Learning Strategies

Lectures. Tutorials.

Learning Materials

Useful Websites

- http://www.dcs.lancs.ac.uk
- http://www.1-3com.com

Reference Text:

- Modern Digital and Analog Communication Systems, B. P. Lath and Zhi Dingi, Oxford University Press, Newyork Oxford, 2009.

Supplementary Readings:

- IEEE communications magazine.
- Simon Haykin ,Communication Systems,John Wiley.,2001.

Assessment Scheme

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

Assessment Pattern

• Class Participation/Assignments	10%
• Tests and Quizzes	10%
• Lab/Projects	20%
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Total	**100%**

Learning Unit Contact Hours Per Week

• Lectures	3 hrs / week
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• Total study hours	144 hrs/semester

Module Leader

Staff

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FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ECE4531**
Title	**: Satellite Communication Systems**
Level	**: 4**
Credit Hours	**: 3**
Pre or Corequisites	**: ECE 462 + ECE 464**

AIMS

This module is designed to provide students with global view of satellite systems, its missions, frequency allocation and orbits specification, the link budget calculation for both the uplink, and the downlink, the communication system of the satellite and earth stations, digital modulation, satellite access, and satellite services.

SYLLABUS

Topics
Satellite systems and Orbits
Losses in space links
Satellite system noise temperature
Link budget calculation
Up and down links
Digital signals
Satellite access
Satellite and earth station communication system
Satellite services

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Synthesize the satellite orbits and the earth stations.
2. Differentiate satellite subsystems.

Skills

After completing this course students will be able to:

1. Design the up and down links.
2. Analyze the digital signals and satellite access and services.
3. Perform uplink and down link budget calculation.

Teaching/Learning Strategies

- Lectures.
- Tutorials
- Individual / Group Project.
- Class Presentations.

Learning Materials

Useful Websites

- http://www.movingbutterflies.com

- http://www.itri.loyola.edu

Reference Text:

- Dennis Roddy, Satellite Communications, McGraw–Hill Co.,2001.

Supplementary Readings:

- Galiardi,robert, M., Satellite Communication, Van Nostrand Reinhold 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%
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• Lectures	3 hrs / week
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• Total study hours	108 hrs/semester

Module Leader

Staff

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MODULE OUTLINE

Module Code	**: ECE 4532**
Title	**: Microwave Devices**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: Co ECE 454**

AIMS

This module is designed to provide students with an in depth coverage of the Two–cavity Klystron, Reflex Klystron, TWT amplifiers, Cylindrical magnetron oscillator, Tunnel diode amplifier/oscillator, Gunn–effect diode A/O, Read / IMPAT diode, and TRAPATT diode.

SYLLABUS

Topics
Two–cavity Klystron
Reflex Klystron
Magnetron
TWT amplifiers
Cylindrical magnetron oscillator
Tunnel diode amplifier/oscillator
Gunn–effect diode A/O
Read / IMPAT diode
TRAPATT diodes

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Examine various microwave devices.
2. Compare the performance of different microwave devices.

Skills

After completing this course students will be able to:

1. Synthesize the performance and applications of different microwave devices such as Klystron, TWT amplifiers, and Gunn–effect diode.
2. Design various microwave devices.
3. Construct an experiment to characterize active microwave devices.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Laboratories.

Learning Materials

Useful Websites

- http://www.tmd.co.uk
- http://www.mwdevices.com

Reference Text:

- Samuel Liao, Microwave Devices and Circuits, Prentice – Hall,1996.

Supplementary Readings:

- IEEE microwave theory and techniques magazine.
- Collin, R.E., Foundations of Microwave Engineering, McGraw Hill Book Co., New York, 2000.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

Staff

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FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 4533**
Title	**: Process Control**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE455**

AIMS

This module is designed to provide students with the necessary knowledge about instrumentations and controllers used in industrial process control. It introduces process characteristics, modeling of simple systems, controller tuning, and designing closed feed back control.

SYLLABUS

Topics
Process Control System: Terms and objectives, piping and Instrumentation diagram, instrument terms - and symbols. Regulator and servo control, classification of variables.
Process characteristics: Process equation, degrees of freedom, modeling of simple systems – thermal, gas, liquid systems. Process lag, load disturbance and their effect on processes. Self-regulating processes, interacting and moninteracting processes.
Controller modes: Basic control action, two position, multi position, floating control modes. Continuous controller modes: proportional, integral, derivative. Composite controller modes: P-I, PD, P-I-D, Integral wind-up and prevention. Auto/Manual transfer. Response of controllers for different test inputs. Selection of control modes for processes like level, pressure, temperature and flow.
Controller tuning Methods: Evaluation criteria - IAE, ISE, ITAE. Process reaction curve method, continuous oscillation method, damped oscillation method. Auto tuning. Closed loop response of I & II order systems, with and without valve, measuring element dynamics.
Final control elements: Pneumatic control valves, construction details, types, various plug characteristics. Valve sizing. Selection of control valves. Inherent and installed valve characteristics. Cavitation and flashing in control valves. Valve actuators and positioners. Instrument air supply specifications.
Advanced control system: Cascade control, ratio control, feed forward control. Over-ride, split range and selective control. Multivariable process control, interaction of control loops.
Case Studies

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Define common elements used in process control system
2. Describe the operation of controller and final control elements.

Skills

After completing this course students well be able to:

1. Tune PID controller
2. Design a feed back control for simple industrial control system

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

Learning Materials

Useful Websites

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

Reference Text:

- Shinskey, "Process Control Systems", 4th ed., McGraw Hill, Singapore, 1996.

Supplementary Readings:

- Smith C.L and Corripio.A..B, Principles and Practice of Automatic Process Control, 2nd ed., John Wiley and Sons, New York, 1998.
- Coughanowr, *Process* Systems Analysis and Control, 2nd ed., McGraw Hill, 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 Unit Contact Hours Per Week

• Lectures	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

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MODULE OUTLINE

Module Code	**: ECE 4534**
Title	**: Industrial Electronics in Practice**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 363**

AIMS

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

SYLLABUS

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

LEARNING OUTCOMES

Knowledge

After completing this module, students will be:

1. Review many different electronic circuit applications.
2. Choose the appropriate circuit for special applications.

Skills

After completing this course students well be able to:

1. Design complete electronic system.
2. Apply different software to check the functionality of electronic circuits.
3. Use data sheets for different electronic components.
4. Write conclusions in technical reports provided with experimental verification.

Teaching/Learning Strategies

- Presentations
- Review and discussion sessions
- Write Reports.
- 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 organized into groups of maximum three 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 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

• Circuit design	10%
• Software utilization	10%
• Experimental check	10%
• Project functionality	30%
• Project finishing	5%
• Project report	25%
• Project presentation	10%
Total	**100%**

Learning Unit Contact Hours

• Sessions	4.5	hrs / week
• Total class contact hours	63	hrs/semester
• Total self study hours	45	hrs/semester
• Total study hours	108	hrs/semester

Module Leader:

Staff

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MODULE OUTLINE

Module Code	**: ECE 4535**
Title	**: Special Topics in Electronics**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: Consents of Instructor & 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
Knowledge
After completing this module, engineering students will be able to:
1. Use research methods and techniques to contribute to a solution of an advanced problem in Electronics.
2. Ability to pursue further research in Electronics.

Skills
After completing this module, engineering students will be able to:
1. Acquire research methodology tools in Electronics.
2. Evaluate the new research ideas with respect to available technology.
3. Provide good presentation on a new subject in Electronics.

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

• Sessions	3 hrs / week
• Total class contact hours	42 hrs / semester
• Total other study hours	66 hrs / semester
• Total other study hours	108 hrs / semester

Module Leader

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MODULE OUTLINE

Module Code	**: ECE 4536**
Title	**: Advanced Topics in Electronics**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: Consents of Instructor & 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
New Trends in Electronics research.
Concentration on a specific advanced topic in Electronics.

Learning Outcomes
Knowledge
After completing this module, engineering students will be able to:
1. Use research methods and techniques to contribute to a solution of an advanced problem in Electronics.
2. Ability to pursue further research in Electronics.

Skills
After completing this module, engineering students will be able to:
1. Acquire research methodology tools in Electronics.
2. Evaluate the new research ideas with respect to available technology.
3. Provide good presentation on a new subject in Electronics.

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

• Sessions	3 hrs / week
• Total class contact hours	42 hrs / semester
• Total other study hours	66 hrs / semester
• Total other study hours	108 hrs / semester

Module Leader

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MODULE OUTLINE

Module Code	**: ECE 454**
Title	**: Microwave Engineering**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 364**

AIMS

This module is designed to enable students to study in depth the analysis of the Microwave Systems, transmission lines, and matching techniques. Waveguides, planar transmission lines and cavity resonators are presented with the relevant design techniques, and modes of excitation. Description of microwave networks using different methods such as S-matrix, Y and Z matrices and ABCD matrix are also presented. Finally, Some microwave components are studied.

SYLLABUS

Topics
Microwave Systems
Waves on an Ideal Transmission Line
Smith Chart Impedance
Matching Single – Stub
Matching Double – Stub
Matching
Quarter – Wave Transformer
Rectangular Wave guides
Circular Wave guides
Cavity Resonators
Analysis of Microwave Network
Impedance matrix
Scattering matrix
Examples of Microwave passive devices

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Acquire knowledge of the Microwave Systems
2. Classify the wave solution and its applications
3. Classify Microwave components

Skills

After completing this course students will be able to:

1. Design transmission lines for different applications.
2. Analyze rectangular and circular waveguides and cavity resonators
3. Synthesize microwave systems.

4. Implement microwave experiments using klystron, and matching different equipments like the source and SWR meter, and different microwave passive equipments like slotted line measurements to get unkown frequencies, fixed and variable attenuators, 3,4 port directional coupler, and maject tee.

Teaching/Learning Strategies

- Lecture.
- Tutorials
- Laboratory
- Field Trips

Learning Materials

Useful Websites

- http://www.Rfcafe.com
- http://www.stanford.edu/class/ee246/links.html

Reference Text:

- Robert Collin, Foundations for Microwave Engineering, McGraw–Hill, Inc,2nd ed.,2001.

Supplementary Readings:

- IEEE microwave theory and techniques .
- Robert Collin , Field Theory of Guided Waves , IEEE Press Piscataway, N.S.,1991.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

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MODULE OUTLINE

Module Code	: ECE 455
Title	**: Automatic Control Systems**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 365**

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

Knowledge

After completing this course students will be able to:

1. Comprehend the fundamental concepts of feedback control systems theory
2. Illustrate the behavior and the stability of simple control systems using time domain and frequency domain methods.

SKills

After completing this course students will be able to:

1. Link the industrial real systems with the control theory:
   - Formulate the control problem
   - Derive the mathematical model
   - Analyze the open loop performance

2. Design, implement, and evaluate the controller using MATLAB® and Simlink.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/ Group Project/Term 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:

- Ogata, 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 Eddition.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	**144 hrs/semester**

Module Leader

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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
Microprogrammed Control Unit
Central Processing Unit
Operating Systems
Input/Output Organization
Memory Organization

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Introduce the structure and function of computer modules.
2. Understand the modern computer organization, architecture, and operating systems.

Skills

After completing this course students will be able to:

1. Utilize computer-based systems.
2. Design and build Arithmetic Logic units, Control units, and Central Processing Units.
3. Develop and test computer-based systems.

Teaching/Learning Strategies

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

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

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MODULE OUTLINE

Module Code	**:ECE 461**
Title	**:Electronic Circuits IV**
Level	**:4**
Credit Hours	**:3**
Prerequisites	**:ECE 451**

AIMS

This module is designed to enable students to focus on the design and analysis of the active circuits, active filters, multiple feedback operational amplifiers, and multiple feedback flters.

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SYLLABUS

Topics
Operational Amplifier circuits and compensation methods for finite gain amplifier.
Active Circuits Based on Passive Lader Structure.
Active Filters using Finite Gain amplifiers.
Multiple Feedback Signal Op-Amp Filters.
Multiple Feedback Biquad Filters.
Approximation Problemand Frequency Transformations.
Current Conveyor and its applications.

LAB EXPERIMENTS

- Op-Amp filters applications

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Differntiate between various types of Active filters
2. Understand the principles of active circuits design techniques.

Skills

After completing this course students will be able to:

1. Design active filters.
2. Syntheisise different types of active filters .
3. Design, implement, test, and analyze Active circuits.

Teaching/Learning Strategies

- Lectures.
- Labratories.
- Team projects / Term Paper.
- Tutorials.
-

Learning Materials

Software Requirements

- Multisim, P Spice, ADS.

Reference Text:

1- S. Franco: Design with operational Amplifiers and Analog Integrated Circuits.

2- L. Huelsman: Active and Passive Analog Filter Design
3- A. Budak: Passive and Active Network Analysis and Synthesis.

- Supplementary Readings:

1- H. Lam: analog and digital Filters, Design and Realization.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

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MODULE OUTLINE

Module Code	**: ECE 462**
Title	**: Communication Systems II**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 452 + MAT 361**

AIMS

This module is designed to enable students to focus on the analysis of the DPCM – errors. It presents AWGN definition, Noise in CW modulation schemes, ISI – M-array, Nyquist channel, Eye pattern diagram, Pass band transmission signal space**,** and channel model. In addition, max. likelihood decoding- probability of error, Correlation Rx, PSK, PSK signal space, probability of error/ generation and detection, FSK signal space, probability of error/ generation and detection**,** MSK phase tree and trellis, GPSK generation and detection, M-array systems, combined amplitude and phase, prob. Error, Spread spectrum, direct sequence, and frequency hopping are also introduced.

SYLLABUS

Topics
Pass Band Transmission Signal Space.
Inter-Symbol Interference ISI
Noise Analysis in Continuous Modulation Schemes
Channel Model, Max. Likelihood Decoding- Probability of Error
ASK Signal Space, Probability of Error/ Generation and Detection
PSK Signal Space, Probability of Error/ Generation and Detection
FSK Signal Space, Probability of Error/ Generation and Detection
MSK Phase tree and Trellis, GPSK Generation and Detection
M-array Systems, Combined Amp, and Phase, Prob. Error
Spread spectrum, direct sequence, Frequency Hopping

LAB EXPERIMENTS

- Sampling
- Pulse amplitude modulation
- Pulse width and phase modulation
- Delta modulation

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Distinguish various communication systems**.**
2. Illustrate system performance in noisy and inter symbol interference environment.

Skills

After completing this course students well be able to:

1. Evaluate Communication systems performance.
2. Synthesize the ASK, PSK and FSK signal space.

3. Analyze communication channels.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Class Presentations.
- Team Projects / Paper.

Learning Materials

Useful Websites

- http://www.dctl.com
- http://www.dealtime.com/advanced_digital_communication

Reference Text:

- Simon Hykin ,Communication Systems,John Wiley,2001.

Supplementary Readings:

- IEEE communication magazines.
- Halsal, F., Computer networking and the internet, Addison Weley, 2005.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
Tutorials	1.5 hrs / week
Laboratories	1.5 hrs / week
Total class contact	84 hrs/semester
Total self study hours	60 hrs/semester
Total study hours	144 hrs/semester

Module Leader

Staff

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MODULE OUTLINE

Module Code	**: ECE 4631**
Title	**: Communication Transmission Systems**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 462**

AIMS

This module is designed to provide students with the necessary knowledge about communication, transmission and systems, and how all relate to what we do everyday. The students will examine source, encoder (transmitter), channel, and receiver functions in communication transmissions of all types. Emphasis will be placed on principles of line (wired) and air (wireless) communication, a study of various systems, and future developments in communication transmission systems.

SYLLABUS

Topics
Communication Model
Electronic Communication
Phone Systems/RFP/Proposal Process
The Telephone, Telephone Network Digital and Analog Signals
Voice and Data Applications
Making a Plan
Telephony; Cabling
Computer Telephony Integration
Telecommunications Funding
PBX Systems and VoIP
Cellular and Wireless Technology
DSL vs. Cable

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Describe the difference between line and “air” technologies
2. Discuss the impact of the digital revolution in transmission systems

Skills

After completing this course students well be able to:

1. Identify methods of transferring messages through various types of channels
2. Utilize resources to research communication transmission systems and make informed recommendations/decisions given a set of requirements.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

Learning Materials

Useful Web

- http://www.ala.org/ACRL

Reference Text:

- Bates, R.J. & Gregory, D.W. (2000). Voice & Data Communications Handbook (4th Edition), McGraw-Hill.

Supplementary Readings:

- Straubhaar, Joseph and LaRose, Robert; Communication Media in the Information Society; Wadsworth Publishing Co., Boston, MA 1997.
- Alley, M. (2000). The craft of editing: A guide for managers, scientists, and engineers. New York: Springer Science+Business Media, Inc.

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

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MODULE OUTLINE

Module Code	**: ECE 4632**
Title	**: Digital Image Processing**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ESE 466**

AIMS

This module is designed to introduce students to analytical tools and methods that are currently used in digital image processing. It introduces human visual system and image model. Digital image processing tools are used in the laboratory for image restoration, enhancement and compression.

SYLLABUS

Topics
Overview, Computer Imaging Systems
Image Analysis, Preprocessing, CVIPlab
Human Visual System, Image Model
Discrete Transforms, Fourier
Discrete Cosine, Walsh-hadamard, Haar, PCT, filtering
Filtering, Wavelet Transform, Pseudocolor
Image Enhancement, Sharpening, Smoothing
Image Restoration, Overview, System Model, Noise
Image Restoration: noise removal, degradation model, inverse filter
Freq. filters, geometric transforms
Image Compression: system model, lossless methods
Image Compression: lossy methods, work on project

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Understand digital image processing techniques
2. Explain fundamentals of image acquisition, representation, compression, and frequency and spatial domain transformations

Skills

After completing this course students well be able to:

1. Apply techniques for image compression, analysis and segmentation.
2. Implement hands-on projects involving processing of images.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

Learning Materials

Useful Web

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

Reference Text:

- Umbaugh , Scott E , "Computer Imaging: Digital Image Analyis and Processing " , The CRC Press, Boca Raton, FL, January 2005

Supplementary Readings:

- Umbaugh,S.E ,"Computer Vision and Image Processing: A Practical Approach
  Using CVIPtools" - Prentice Hall PTR, Upper Saddle, NJ, 1998
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Computers

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 4633**
Title	**: Programmable Logic Controller**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 356**

AIMS

This module is designed to provide students with the necessary knowledge and skills about fundamental concepts of programmable logic controllers, principles of operation, and numbering systems as applied to electrical controls. It also provides the student with tools to design PLC systems.

SYLLABUS

Topics
Micro Programmable Logic Controllers
Programming a Programmable Controller
Number Systems
Introduction to PLC Operation
Introduction to Logic
Input and output Modules
PLC Processors
Processor Data Organization
The Basic Relay Instructions
Understanding Relay Instructions and the Programmable Controller Input Modules

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Design the various parts of a programmable logic controller
2. Evaluate how the parts of PLC function together

Skills

After completing this course students well be able to:

1. Convert with hands on experience the ladder diagrams into programs.
2. Incorporate timers and counters utilizing programmable logic controllers.
3. Execute and evaluate programs.
4. Design conditiong circuits required to operate sensors correctly.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

Learning Materials

Useful Websites

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

Reference Text:

- Mazur ,Glen A.; Weindorf ,William J. ; Introduction to Programmable Logic Controllers, Delmar, a division of Thomson Learning, Inc., ISBN 0-7668-1768-7, 2006.

Supplementary Readings:

- Petruzella, Frank D. ; Programmable Logic Controllers, McGraw-Hill .

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 4634**
Title	**: Power Electronics**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 363**

AIMS

This module is designed to provide students with the necessary knowledge about power semiconductor devices and the most common types of power converters used in real applications. It also enables students to evaluate and analyze basic power electronic circuits.

SYLLABUS

Topics
Introduction to power electronics
Power semiconductor devices and driving circuits
DC-DC converters
Pulse-width modulated inverters
Controlled rectifiers
AC voltage controllers
Applications of power electronics

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Select the approperiate converter type for specified application.
2. Interface power electronic circuits with other systems.

Skills

After completing this course students well be able to:

1. Evaluate and analyze power electronic circuits.
2. Choose approperiate driving circuits for semiconductor devices used in power converters.
3. Design switching DC-DC converters.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

Learning Materials

Useful Websites

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

Reference Text:

- Rashid,Muhammad H., Power Electronics Circuits, Devices, and Applications, Pearson Education, Inc.

Supplementary Readings:

- Lee, R. W. , Power Converter Handbook- Theory Design and Application, Canadian General Electric, Petersburugh, Ontario, 1979

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 4635**
Title	**: Avionics Navigation Systems**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 462**

AIMS

This module is designed to provide students with an in-depth overview of the Avionics Navigation systems. It covers the growth of Integrated Avionics concepts as well as various types of Avionics Navgation systems.

SYLLABUS

Topics
An Introduction to Avioncs Navigation Systems
Navigation Equations
Multisensors Navigation Systems
Terrestrial Radio Navigation Systems
Satellite Radio Navigation Systems
Inertial Navigation
Landing Systems
Air Traffic Management
Radio Altemeter

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Understand the concept of Integrated Avionics Navigation systems.
2. Recognize the various Avionics Navigation applications.

Skills

After completing this course students well be able to:

1. Analyse different Avionics Navigation systems.
2. Design Avionics Navigation applications.
3. Select between various integrated Avionics approaches

Teaching/Learning Strategies

- Lectures
- Tutorials
- Individual/Group Project/Term Paper

Learning Materials

Reference Text:

- Myron Kayton and Walter R. Fried, Avionics Navigation Systems, Library of Congress, 1997.

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSAUNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ECE 464**
Title	**: Antenna Theory and Design**
Level	**: 4**
Credit Hours	**: 3**
Prerequisites	**: ECE 454**

AIMS

This module is designed to provide students with an in depth coverage of the antenna types and radiation mechanism. Antenna fundamentals such as patterns, directivity, and radiation power density, directivity, gain, efficiency, half-power beam width, beam efficiency, bandwidth, polarization, input impedance are presented.

SYLLABUS

Topics
Antenna Types and radiation mechanism
Far field approximation and power transmitted
Antenna fundamentals (pattern, directivity, radiation)
Antenna fundamentals (directivity, gain, efficiency)
Microstrip Antennes
Infinitésimal dipôle
Small dipole
Half-Wavelength dipole
Ground effects
Types of arrays
Two-Element array
N-Element linear array

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Identify the basic fundamentals of antenna.
2. Recognize antennas used for different frequency applications.

Skills

After completing this course students will be able to:

1. Design microstrip and wire antennas for different frequency applications.
2. Analyze the performance of microstrip and wire antennas through mathematical manipulations.
3. Analyze the effect of the antenna arrays on performance.

4. Test antennas performance using a test bed by using various transmitter antennas; drawing their radiation pattern and calculating its input impedance

Teaching/Learning Strategies

- Lectures.
- Tutorials.

Learning Materials

Useful Websites

- http://www.walmart.com
- http://www.josseybass.com

Reference Text:

- Constantine Balanis, Antenna Theory, John Wiley ,Inc.,2000.

Supplementary Readings:

- IEEE Antennas and Propagation Magazine.
- Stutzman, W. L. and Theiele, G. A.,Antenna Theory and Analysis, Wiley, New York,2000.

Assessment Scheme

- Assignments.
- Class written Tests/Quizzes.
- Lab/Projects
- Unseen written Mid-Term Exam (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

Staff

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ECE 465**
Title	**: Information Theory & Coding**
Level	**: 4**
Credit Hours	**: 3**
Pre or Co-requisites	**: ECE 462**

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

Knowledge

After completing this course students will be able to:

1. Categorize the various codes, and compare between them.
2. Illustrate different error correcting codes.

Analyze and design different source and channel Skills

After completing this course students will be able to:

1. Formulate the coding theory.
2. Apply the concept of Hamming distance and Shannon's theorem.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Class Presentations.
- 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 (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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ECE 466**
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

Knowledge

After completing this course students well be able to:

1. Know the mathematical tools used with digital signals.
2. Extract information from digital signals

Skills

After completing this course students well be able to:

1. Apply z-transform properties and theorems and DFT to digital signals.
2. Design digital FIR filters to meet specific filtering criteria .
3. Analyze and synthesize signals based on DFT.

Teaching/Learning Strategies

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

Learning Materials

Software

MATLAB

Useful Websites

- http://www.web-ee.com

Reference Text:

- Proakis , J. G., and D. G. Manolakis, *Digital Signal Processing: Principles, Algorithms, and Applications*, 4th edition, Prentice-Hall, 2007

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 (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

Staff

500’s LEVEL MODULES

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

Knowledge

After completing this course students will be able to:

1. Understand both Direct Current and Alternating Current machines including D.C. Motors, Generators, A.C. Induction Motors A.C. Alternators, Transformers, and Power Stations.
2. Recognize the principles of high voltages and high currents**.**

Skills

After completing this module, students will be able to:

1. Experiment the basic Electromechanical Energy Conversion devices.
2. Analyze the performance of elctrical motors and transformers.
3. Solve problems in high power sources

Teaching/Learning Strategies

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

Learning Materials

Reference Text:

1- P.C.Sen "Principles of Electric Machines and Power Electronics " 2nd edition, 2003.

2- B.T. Theraja "A Text Book of Electrical Techology" New Delhi,1989.

3- Vincent del Toro " Electromechanical Devices for Energy Conversion and Control System" new edition International edition, Prentice-Hall Inc.

Software Requirements: MATLAB

Supplementary Readings: IEEE Magazine

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 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 464**

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

Knowledge

After completing this course students well be able to:

1. Explain technical aspects, and operations.
2. Compare different generations of cellular mobile and personal communication technologies.
3. Differntiate among wireless communication systems and their standards.

Skills

After completing this course students well be able to:

1. Compare different generations of cellular systems
2. Solve problems encountering design and capacity improvement
3. Analyze a cellular system performance
4. Discuss and explain the operation of wireless mobile Radio Channel

Teaching/Learning Strategies

- Lectures
- Tutorials
- Individual/Group Project

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 (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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 5531**
Title	**: Global Positioning Systems**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 462, ECE 464**

AIMS

This module is designed to provide students with an in-depth overview of the global positioning system. It covers the growth of GPS and its applications .In addition various types of GPS systems, GPS Space segments, Control segment, and user segment are presented.

SYLLABUS

Topics
An Introduction to the Global Positioning System GPS System Architecture
Satellite Signal Structure Receivers, Measurements, and Performance
GPS Coordinate Frames, Time Reference, and Orbits
Error sources in GPS
Differential GPS Systems
GPS signal and Timing
Tracking Systems using GPS
GPS Receivers Power calculation and noise analysis GPS Applications

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. **Identify different GPS segments and understand the theory of operation of each segment.**
2. **Read and interpret the GPS data format.**
3. **Understand the different applications of the GPS system.**

Skills

After completing this course students well be able to:

1. Design a GPS data collection project, using GPS data collection tool to collect and process GPS data.
2. Design and implement real life GPS applications.
3. Evaluate the GPS measurements accuracy and asses various methods to improve accuracy.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Individual/Group Project/Term Paper

Learning Materials

Useful Websites

- IEEE Transcation Microwave Theory, Tech.
- IEEE Antenna and Propagations Magazine
- http://www.eu.wiley.com

Reference Text:

- **Pratap Misra, and Per Enge, Global Positioning System: Signal, Measurement, and Performance, Revised Second Edition, 2011, Ganga-Jamuna Press.**

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY

FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ECE 5532**
Title	**:** Fiber Optics and Laser Technology
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 363**

AIMS

This module is designed to introduce students to the materials of optoelectronics, light propagation in media, light propagation in waveguides, optical properties of semiconductors, light detection and imaging, light emitting diodes, and laser diodes.

SYLLABUS

Topics
Overview Of Optical Fiber.
Optical Fibers: Structures, Waveguiding, And Fabrication.
Signal Degradation In Optical Fibers.
Optical Sources From Light To Laser.
Power Launching And Coupling.
Photodetectors
Optical Receiver Operation.
Advanced Laser System And Technology.

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Recognize the basic characteristics and operation theory of optoelectronics .
2. Identify the components of optical receivers and transmitters.
3. Illustrate the perormance of optical systems

Skills

After completing this course students well be able to:

1. Analyze the light propagation in media and in waveguides .
2. Design and implement optical communication systems.
3. Test and evaluate the performance of optical communication systems

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Team projects / Term Paper.

Learning Materials

Useful Websites

- http://www.gtopto.com
- http://www.optoelectronics.org.uk

Reference Text:

- Jasprit Sing, Optoelectronics and an Introduction to Materials and Devices, McGraw-Hill-new eddition.

Supplementary Readings:

- IEEE Lasers and Electo-Optics papers 2005.
- Joseph Verdeyen ,Laser Electronics, Prentice Hall,1995.

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	3 hrs / week
Tutorials	1.5 hrs / week
Total class contact hours	63 hrs/semester
Total self study hours	45 hrs/semester
Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 5533**
Title	**: Digital Control**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 362 – ECE 365– ECE455**

AIMS

This module is designed to provide students with the necessary insight on the computer control. It includes introduction to computer control and discrete system, analysis of discrete time systems, transfer function, transient response, stability analysis jury methods, root locus method, state space approach, and observable and canonical forms.

SYLLABUS

Topics
Introduction to computer control and discrete system
Sampling process
Analysis of discrete time systems
The transfer function
The block diagram and the signal flow graph
Transient response " the impuls response and the unit step respons" and steady state errors
The stability analysis jurry methods
The root locus mehods
The state space approach ; Matrix representation, state transition matrix , state transition equation and transfer function.
The observal and controllable canonical forms

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Identify the fundamental concepts of digital control systems.
2. Acquire the basic control design procedures.
3. Illustrate performance analysis steps of digital control systems.

Skills

After completing this course students well be able to:

1. Analyze digital control systems.
2. Design, implement, and evaluate digital control system, using design packages such as MATLAB® and Simulink.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

Learning Materials

Useful Websites

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

Reference Text:

- Charles L. Phillip and H. troy Nagle, Digital Control System Analysis and Design:, Prentice Hall International, Inc..

Supplementary Readings:

- Astrom, Karl J. ; and Bjorn Wittenmark , Computer-Controlled Systems- Theory and Design, Tsinghua University Press Prentice Hall.
- Kuo, B. C. (1980). *Digital Control Systems.* Holt-Saunders. Tokyo.

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 5534**
Title	**: Biomedical Electronic Engineering**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 363+ ECE 466**

AIMS

This module is designed to introduce students to Biomedical and Clinical Instrumentation. Through lectures and laboratories, students will be taught how to build devices to measure ECG, blood pressure and respiration parameters. Circuit models of physiological system are demonstrated with electrical models. Students are introduced to the principles of physiological sensors. Visits to hospital, clinical, and laboratories allow students to see actual devices and meet with clinicians who use them. Students are expected to write reports on clinical Instruments or on projects to build biomedical devices.

SYLLABUS

Topics
Electro physiology: Review of physiology and anatomy, resting potential, action potential, bioelectric potentials, cardiovascular dynamics, electrode theory, bipolar and unipolar electrodes, surface electrodes, physiological transducers. Systems approach to biological systems.
Bioelectric potential and cardiovascular measurements: EMG - Evoked potential response, EEG, foetal monitor. ECG phonocardiography, vector cardiograph, BP, blood flow cardiac output, plethysmography, impedance cardiology, cardiac arrhythmia's, pace makers, defibrillators.
Respirator and pulmonary measurements and rehabilitation: Physiology of respiratory system, respiratory rate measurement, artificial respirator, oximeter, hearing aids, functional neuromuscular simulation, physiotheraphy, diathermy, nerve stimulator, artificial kidney machine.
Patient monitoring systems: Intensive cardiac care, bedside and central monitoring systems, patient monitoring through bio-telemetry, implanted transmitters, telemetering multiple information. Sources of electrical hazards and safety techniques.
Recent trends: Medical imaging, X-rays, laser applications, ultrasound scanner, echo cardiography, CT Scan MRI/NMR, cine angiogram, colour doppler systems, Holter monitoring, endoscopy.

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Describe the principles of medical imaging.
2. Recognize various bio-medical instruments.

Skills

After completing this course students well be able to:

1. Apply digital signal processing to biomedical engineering.
2. Design and implement biomedical instruments.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

Learning Materials

Useful Websites

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

Reference Text:

- Cromwell, Leslie, Fred J. Weibell and Erich A. Pfeiffer, "Biomedical Instrumentation and Measurements", Prentice Hall, New Delhi, 2nd ed., 1998.
- Rangan , Sharma , Mani-Tata ,"Instrumentation Devices and Systems"- McGrawhill-Second Edition

Supplementary Readings:

- Webster, Medical Instrumentation: Applications and Design
- Geddes L. A. and Baker L. E., "*Principles of Applied Biomedical Instrumentation*", 3rd Edition,John Wiley, New York, 1989.

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 5535**
Title	**: Radar Systems**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 454**

AIMS

This module is designed to provide students with an in-depth overview of the Radar systems and covers the growth of Radar Technology and applications. Basics Radar Equation, Radar theory of operation, Radar types, Radar Operating modes and different Radar modules are also introduced.

SYLLABUS

Topics
An Introduction to RADAR
RADAR Equation
CW and Frequency Modulated RADARs
MTI and Pulse Doppler RADAR
Tracking RADAR
RADAR Transmitters
RADAR Antennae
RADAR Receivers
Modes of Operation: Search, Tracking, and Lock on modes.
Detection of RADAR's signal in noise.
Extraction of Information from RADAR signal.
Propagation of RADAR waves
Examples of RADAR systems: Search Radar, Weather Radar, Fire Control RADAR, and Imaging RADAR.

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Discuss the basic concept of RADAR.
2. Identify the different parameters of the RADAR equation.
3. Recognize the structure and function of the RADAR modules.
4. Differentiate between different Radar types and different Radar Modes.

Skills

After completing this course students well be able to:

1. Solve Radar Equation for different ranges of parameters
2. Analyse the different operating modes of the RADAR systems.
3. Explain the structure and function of RADAR modules.
4. Design RADAR Receiver, Transmitter, and Antenna.

Teaching/Learning Strategies

- Lectures
- Tutorials
- Individual/Group Project/Term Paper

Learning Materials

Useful Websites

- IEEE Transcation Microwave Theory, Tech.
- IEEE Antenna and Propagations Magazine
- http://www.eu.wiley.com

Reference Text:

- Merrill Ivan Skolnik, Introduction to Radar Systems.

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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

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FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**:ECE 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

Knowledge

After completing this module, engineering students will be able to:

1. Recommend research methods and techniques to contribute to a solution of an engineering problem.
2. Determine how to deal with real - life engineering, industrial or service system.

Skills

After completing this module, engineering students will be able to:

1.Contact a company sponsor, if any, to recognize its needs.
2. 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.
3. Compare alternative approaches and designs, on the basis of engineering principles to meet these requirements.
4. Implement and operate the designated model, prototype, or method to satisfy those requirements.

5. Evaluate the results against the requirements, using performance measures.
6. Compose a variety of research documents including professional communications, letters and sketches in a student portfolio.
7. Produce collaboratively appropriate written reports, taking into consideration the format and citation.
8. Prepare oral presentations for supervisors and senior students during several seminars.

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.

SupplementaryReading:

- 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	3 hrs / week
• Total class contact hours	42 hrs / semester
• Total other study hours	66 hrs / semester
• Total other study hours	108 hrs / semester

Module Leader

Staff

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
Combinational Circuit Design. Crcuit families, low power circuit design, Silicon on Insulator circuit design **Sequential Circuit Design** Sequencing static circuit, circuit design of latch and DFF static sequencing element methodology, Sequency dynamic circuits.

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

1. Organize the basic principles of designing a VLSI chip.
2. Illustrate how to use CAD tools to layout CMOS circuits.

Skills

After completing this course students will be able to:

1. Synthesize the digital VLSI design.
2. Simulate the design of logic operations.
3. Implement FPGA in different applications.

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 (1.5-hr. Exam).
- Unseen written Final-Exam (3-hr. 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Laboratories	1.5 hrs / week
• Total class contact	84 hrs/semester
• Total self study hours	60 hrs/semester
• Total study hours	144 hrs/semester

Module Leader

Staff

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MODULE OUTLINE

Module Code	**: GSE 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

Knowledge

After completing this module, students will be able to :

1. Apply Engineering expertise as a part of Social Experimentation.
2. Learn more about their responsibility towards Employees and safety.
3. Apply moral Reasoning & Ethical Theories.
4. Enforce rights of Engineers.
5. Undersatnd all principles of accident causation .
6. Practice this knowledge in the work place setting, through interactive sessions and site visits.
7. Appreciate the importance of assurance, and understand approaches to auditing.

Skills

After completing this module, students will be able to:

1. Gain skills in the analysis of safety program effectiveness.

2. Develop the hazard communication.
3. Enhance capabilities in risk assessment.
4. Develop a better understanding of the rationale for all relavant ethical codes.
5. Act in such a manner as to enhance the honor, integrity and dignity of the profession.
6. Desgin their own instant check list for any facility assigned to them.

Teaching/Learning Strategies

- Lectures.
- Tutorials.
- Field trips

Learning Materials

Software Requirements

- 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 & 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 (12 Home Assignments).
- Tests (1.5- hrs. each, 2 Tests).
- Quizzes (10-min. each, 6 Quizzes).
- Real Industrial Enterprise Case-Study (In-Class Mini Project).
- Unseen Mid-Term Exam (1.5-hr Exam).
- Unseen Final-Exam (3-hr Exam).

Assessment Pattern

• Homework Assignments	10%
• Tests & 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
• Tutorials	1.5 hrs/week
• Total Class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
Total study hours	**108 hrs/semester**

Module Leader

Staff

MSA UNIVERSITY
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MODULE OUTLINE

Module Code	**: ECE 5631**
Title	**: Spread Spectrum Techniques**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 462**

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 & OFDM)
Wireless Channel, Spread Spectrum and Random Variable
Direct Sequence and Spreading Codes
Synchronous CDMA
Asynchronous CDMA
Rake Receiver, Capacity Analysis & Power Control
Orthogonal Frequency Division Multiplexing (OFDM) Basics
Multipath Effects on OFDM
Fading & MC-CDMA
Channel Estimation
Intercarrier Interference
Ultra Wideband (UWB) & Others

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Describe the basic principles of CDMA & OFDM systems
2. Recognize practical limits on CDMA & OFDM

Skills

After completing this course students well be able to:

1. Perform analysis of CDMA & OFDM systems
2. Hands on real CDMA & OFDM systems and protocols

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

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 (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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

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MODULE OUTLINE

Module Code	**: ECE 5632**
Title	**: Cryptography**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 465**

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 Cryprography
Digital signatures and the digital signature standard
Key Management Schemes
Identification Schemes and Biometrics

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Grasp the importance of cryptography in relation to the field of information security.
2. Understand principles of number theory, cryptographic algorithms and cryptanalysis.
3. Learn how various cryptographic schemes work.

Skills

After completing this course students well be able to:

1. Measure the running time of an algorithm and understand the notion of reducing one problem to another.
2. Analyze security of a cryptographic scheme and determine whether or not it is secure.

Teaching/Learning Strategies

- Lectures
- Laboratories

- Tutorials
- 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 & 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 (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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 5633**
Title	**: Robot Dynamics & Conrol**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 362**

AIMS

This module is designed to provide students with the necessary fundamentals of robotics including kinematics, dynamics, motion planning, computer vision, and control.

SYLLABUS

Topics
Rigid motions and homogeneous transformations
Forward and inverse kinematics
Velocity kinematics
Path and trajectory planning
Dynamics
Independent joint control
Multivariable control force control
Geometric nonlinear control
Computer vision
Vision-based control

LEARNING OUTCOMES

Knowledge

After completing this course students well be able to:

1. Identify the most important concepts of robotic systems.
2. Address the basic problems confronted in sensor-based robotic manipulation.
3. Understand the trajectory control of the manipulators.

Skills

After completing this course students well be able to:

1. Derive a control law for each joint of a manipulator.
2. Perform rigorous analysis of the performance of control

Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

Learning Materials

Useful Websites

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

Reference Text:

- Spong, Mark W. , Seth Hutchinson, and M. Vidyasagar , Robot Modeling and Control, 1st ed. , John Wiley & Sons.

Supplementary Readings:

- Morel, G. , T. Liebezeit, J. Szewczyk, S. Boudet, and J. Pot. , Explicit incorporation of 2d constraints in vision based control of robot manipulators. In Peter Corke and James

Trevelyan, editors, Experimental Robotics VI, volume 250 of Lecture Notes in Control and Information Sciences, pages 99–108. Springer-Verlag, 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	3 hrs / week
• Tutorials	1.5 hrs / week
• Total class contact hours	63 hrs/semester
• Total self study hours	45 hrs/semester
• Total study hours	108 hrs/semester

Module Leader

Staff

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MODULE OUTLINE

Module Code	**: ECE 5634**
Title	**: Fundamental to Nanotechnology**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 363**

AIMS

Nano – science and nanotechnology are broad, interdisciplinary areas, encompassing not just materials science but everything from biochemistry to electrical engineering and more. This module is designed to provide students with the necessary knowledge about the field of nanotechnology which related to electrical engineering. It will also introduce students to the rapidly developing field of nano – engineered materials with special focus on their electronic properties. Therefore, fundamental aspects of the electronic properties of these materials, as well as fabrication processes and applications will be discussed in this course.

SYLLABUS

Topics
Why nano – technology
Electronic transport in 1,2 and 3 dimensions
Quantum confinement, energy sub – bands
quantum wells, quantum wires, quantum dots
Effective mass, mean free path in 3D, ballistic conduction
Compound semiconductor nanostructures: growth of compound
Silicon nano - wires
Applications of silicon nano – wires
Silicon nano – wires based batteries
Silicon nano – wires based solar cells
Silicon nano – wires based energy scavenging systems
Techniques for fabricating silicon nano – wires

LEARNINGOUTCOMES

Knowledge

After completing this course students will be able to:

1. Discuss the concept and context of nanotechnology.
2. Describe top-down and bottom-up approaches of nanotechnology
3. Explain the different applications of nano – technology which related to electrical engineering.

Skills

After completing this course students will be able to:

1. Describe methods by which nano scale manufacturing can be enabled.
2. Define a concept for a nano scale electronic devices.
3. Identify the terminology, equipments and techniques that are used in the fabrication, and characterization of nano – structures.

Teaching/Learning Strategies

- Lectures
- Tutorials
- (Individual/Group) Project / Report

Learning Materials

Reference Text:

- Vladimir V. Mitin, Viatcheslav A. Kochelap, Michael A. Stroscio: Introduction to Nanoelectronics: Science, Nanotechnology, Engineering, and Applications, Cambridge University Press, 2008

Supplementary Readings:

- Rainer Waser: Nanoelectronics and Information Technology: Advanced Electronic Materials and Novel Devices, Wiley-VCH, 2003.
- Edward L. Wolf: Nanophysics and Nanotechnology: An Introduction to Modern Concepts in Nanoscience, 2nd ed., Wiley-VCH, 2006.
- John H. Davies: The Physics of Low Dimensional Semiconductors: An Introduction, Cambridge University Press, 1998

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	3 hrs / week
Tutorials	1.5 hrs / week
Total class contact hours	63 hrs/semester
Total self study hours	45 hrs/semester
Total study hours	108 hrs/semester

Module Leader

Staff

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FACULTY OF ENGINEERING

MODULE OUTLINE

Module Code	**: ECE 5635**
Title	**: Special Topics in Communication**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: Consents of Instructor & Advisor**

AIMS

This module is designed to enable students to cope up with new advances in research in Communication.

SYLLABUS

Topics
Review of Communications available today
Advances in Communications research.
Concentration on a specific research topic in Communications.

Learning Outcomes

Knowledge

After completing these module, engineering students will be able to:

1. Use research methods and techniques to contribute to a solution of an advanced problem in Communications.
2. Ability to pursue further research in Communications.

Skills

After completing this module, engineering students will be able to:

1. Acquire research methodology tools in Communications.
2. Evaluate the new research ideas with respect to available technology.
3. Provide good presentation on a new subject in Communications.

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

• Sessions	3 hrs / week
• Total class contact hours	42 hrs / semester
• Total other study hours	66 hrs / semester
• Total other study hours	108 hrs / semester

Module Leader

Staff

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FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 5636**
Title	**: Advanced Topics in Communication**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: Consents of Instructor & Advisor**

AIMS
This module is designed to enable students to cope up with new advances in research in Communication.

SYLLABUS

Topics
Review of Communications available today
New Trends in Communications research.
Concentration on a specific advanced topic in Communications.

Learning Outcomes
Knowledge
After completing these module, engineering students will be able to:
1. Use research methods and techniques to contribute to a solution of an advanced problem in Communications.
2. Ability to pursue further research in Communications.

Skills
After completing this module, engineering students will be able to:
1. Acquire research methodology tools in Communications.
2. Evaluate the new research ideas with respect to available technology.
3. Provide good presentation on a new subject in Communications.

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

• Sessions	3 hrs / week
• Total class contact hours	42 hrs / semester
• Total other study hours	66 hrs / semester
• Total other study hours	108 hrs / semester

Module Leader

Staff

MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code	**: ECE 564**
Title	**: Graduation Project (Part II)**
Level	**: 5**
Credit Hours	**: 3**
Prerequisites	**: ECE 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

Knowledge

After completing these two modules, engineering students will be able to:

1. Use research methods and techniques to contribute to a solution of an engineering problem.
2. Recommend solutions to deal with real life engineering, industrial or service systems.

Skills

After completing this module, engineering students will be able to:

1. Consider alternative approaches and designs, on the basis of engineering principles to meet those requirements.
2. Implement or operate the designated model, prototype, or method to satisfy those requirements.
3. Evaluate the results against the requirements, using performance measures.
4. Compose a variety of research documents including professional communications, letters and sketches in a student portfolio.
5. Produce collaboratively appropriate written reports, taking in consideration the format and citation.
6. Prepare oral presentations for supervisors and senior students during several seminars.

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

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