October University for Modern Sciences and Arts (MSA)

Faculty of Engineering

Computer Systems Engineering Program (CSE)

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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functions-Properties of Functions – Composite Functions.</td>
</tr>
<tr>
<td>Limits – Computational Techniques of Limits.</td>
</tr>
<tr>
<td>Continuity – Limits and Continuity of Trigonometric Functions.</td>
</tr>
<tr>
<td>Inverse Functions – Logarithmic and Exponential Functions – Inverse Trigonometric Functions – Hyperbolic Functions – Inverse Hyperbolic Functions.</td>
</tr>
<tr>
<td>L’Hopital Rule – Indeterminate Forms.</td>
</tr>
<tr>
<td>Taylor and Maclurin series.</td>
</tr>
<tr>
<td>Functions of Two or More Variables – Partial Derivatives – Chain Rules.</td>
</tr>
</tbody>
</table>

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 techniques.
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:**

**Supplementary Readings:**

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

<table>
<thead>
<tr>
<th>Assessment Pattern</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation/Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Tests and Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Final Exam</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**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
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
<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units and Dimensions</td>
</tr>
<tr>
<td>Scalar and Vector Quantities</td>
</tr>
<tr>
<td>Uniform circular motion, Force, work, energy and power</td>
</tr>
<tr>
<td>Oscillations and wave motion</td>
</tr>
<tr>
<td>Elastic properties of matter</td>
</tr>
<tr>
<td>Pressure in fluids</td>
</tr>
<tr>
<td>Fluid statics – Pascal’s and Archimedes’ principles</td>
</tr>
<tr>
<td>Fluid dynamics – Equation of continuity and Bernoulli’s equation</td>
</tr>
<tr>
<td>Viscous flow</td>
</tr>
<tr>
<td>Thermal expansion of solids and liquids</td>
</tr>
<tr>
<td>Heat and thermal energy – Heat and work</td>
</tr>
<tr>
<td>The first law of thermodynamics</td>
</tr>
<tr>
<td>Heat transfer</td>
</tr>
<tr>
<td>Kinetic theory of gases</td>
</tr>
</tbody>
</table>

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:**

**Supplementary Readings:**

**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
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 includes vector operations, and equilibrium of particle.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units and Forces</td>
</tr>
<tr>
<td>Statics of Particles: Plane.</td>
</tr>
<tr>
<td>Statics of Particles: Space.</td>
</tr>
<tr>
<td>Statics of Rigid Bodies: Vector Product.</td>
</tr>
<tr>
<td>Statics of Rigid Bodies: Moments.</td>
</tr>
<tr>
<td>Moment – Couple and Wrench.</td>
</tr>
<tr>
<td>2-D Equilibrium Structure.</td>
</tr>
<tr>
<td>3-D Equilibrium Structure.</td>
</tr>
<tr>
<td>2-D Centroids and Center of Gravity.</td>
</tr>
<tr>
<td>3-D Centroids and Center of Gravity.</td>
</tr>
<tr>
<td>2-D Moment of Inertia.</td>
</tr>
<tr>
<td>3-D Moment of Inertia.</td>
</tr>
<tr>
<td>Real Case Studies.</td>
</tr>
</tbody>
</table>

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://wwwStatics.com
http://www.ent.ohiou.edu
http://www.amazon.com

Reference Text:

Supplementary Readings:

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
# 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

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

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

Reference Text:

Supplementary Readings:
### 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
<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studio Participation</td>
<td>10%</td>
</tr>
<tr>
<td>Lab participation</td>
<td>10%</td>
</tr>
<tr>
<td>Assignments (Studio and Lab)</td>
<td>10%</td>
</tr>
<tr>
<td>Tests and Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Unseen Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Final Exam</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### Learning Unit Contact Hours
<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studio &amp; Lab Wor</td>
<td>4.5 hrs/week</td>
</tr>
<tr>
<td>Lectures</td>
<td>1.5 hrs/week</td>
</tr>
<tr>
<td>Total studio &amp; Lab contact hours</td>
<td>84 hrs/semester</td>
</tr>
<tr>
<td>Total self work hours</td>
<td>60 hrs/semester</td>
</tr>
<tr>
<td>Total work hours</td>
<td>144 hrs/semester</td>
</tr>
</tbody>
</table>

### Module Leader
Staff
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computers Architecture</td>
</tr>
<tr>
<td>Central Processing Unit</td>
</tr>
<tr>
<td>Memory and Storage Deivces</td>
</tr>
<tr>
<td>Input and Output Devices</td>
</tr>
<tr>
<td>Introduction to Matlab and AutoCAD</td>
</tr>
<tr>
<td>Programming techniques including flow charts and languages</td>
</tr>
<tr>
<td>Internet and searching methods</td>
</tr>
<tr>
<td>Software operating systems and tools</td>
</tr>
</tbody>
</table>

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:


Supplementary Readings:


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

<table>
<thead>
<tr>
<th>Module Code</th>
<th>ENG 156</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Academic English Writing</td>
</tr>
<tr>
<td>Level</td>
<td>1</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>3</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>None</td>
</tr>
</tbody>
</table>

## 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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Writing: the Essay</strong></td>
</tr>
<tr>
<td>- Introduction of writing correction code</td>
</tr>
<tr>
<td>- From Grammar to Writing: The Sentence</td>
</tr>
<tr>
<td><strong>Reading: “Unit I”</strong></td>
</tr>
<tr>
<td>- Writing: Describing a Person</td>
</tr>
<tr>
<td>- From Grammar to Writing: Subject/Verb agreement</td>
</tr>
<tr>
<td><strong>Reading: “Unit II”</strong></td>
</tr>
<tr>
<td>- Writing: Describing a Place</td>
</tr>
<tr>
<td>- From Grammar to Writing: Editing exercises</td>
</tr>
<tr>
<td><strong>Reading: “Unit III”</strong></td>
</tr>
<tr>
<td>- Writing: Describing an Event</td>
</tr>
<tr>
<td>- From Grammar to Writing: Parallelism</td>
</tr>
<tr>
<td><strong>Reading: “Unit IV”</strong></td>
</tr>
<tr>
<td>- Writing: Describing a Process</td>
</tr>
<tr>
<td>- From Grammar to Writing: Editing exercises</td>
</tr>
<tr>
<td><strong>Reading: “Unit V”</strong></td>
</tr>
<tr>
<td>- Writing: Distinguishing facts from opinions</td>
</tr>
<tr>
<td>- Specialized Vocabulary</td>
</tr>
<tr>
<td><strong>Writing: Directed Free Writing/Editing</strong></td>
</tr>
<tr>
<td>- From: Grammar to Writing: Parallelism of Gerunds and Infinitives</td>
</tr>
<tr>
<td>- Specialized Vocabulary</td>
</tr>
<tr>
<td><strong>Reading “Unit VI”</strong></td>
</tr>
<tr>
<td>- Writing: Process Writing</td>
</tr>
<tr>
<td>- From Grammar to Writing: Sentences and Fragments</td>
</tr>
<tr>
<td><strong>Reading: “Unit VII”</strong></td>
</tr>
<tr>
<td>- Writing: Process Writing</td>
</tr>
<tr>
<td>- From Grammar to Writing: Editing exercises</td>
</tr>
<tr>
<td><strong>Reading: “Unit VIII”</strong></td>
</tr>
<tr>
<td>- Writing: Expository Writing (Comparison and Contrast)</td>
</tr>
<tr>
<td>- From Grammar to Writing: Punctuation of Adjective Clauses</td>
</tr>
<tr>
<td><strong>Reading: “Unit IX”</strong></td>
</tr>
<tr>
<td>- Writing: Expository Writing (Definition and Partition)</td>
</tr>
<tr>
<td>- From Grammar to Writing: Editing exercises</td>
</tr>
<tr>
<td><strong>Reading: “Unit X”</strong></td>
</tr>
<tr>
<td>- Writing: Expository Writing (Classification)</td>
</tr>
<tr>
<td>- From Grammar to Writing: Avoiding run-on sentences and comma splices</td>
</tr>
<tr>
<td><strong>Reading: “Unit XI”</strong></td>
</tr>
<tr>
<td>- Writing: Practice – Summary Writing</td>
</tr>
<tr>
<td>- From Grammar to Writing: Editing exercises</td>
</tr>
</tbody>
</table>
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.better.english.com
- http://www.eslcafe.com

Reference Text

Supplementary Readings
- Swales, JohnFeak, Christine B.Swales, John M, English in Today’s Research World: A

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

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

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antiderivatives - The Indefinite Integrals – Integration by Substitution.</td>
</tr>
<tr>
<td>Techniques of integration - Basic Integration formulas - Integration by parts - Reduction formulas - Integration using partial fractions - Trignometric Integrals - Trignometric Substitution.</td>
</tr>
<tr>
<td>Double Integrals – Double Integrals in Polar Coordinates – Areas.</td>
</tr>
<tr>
<td>Triple Integrals – Triple Integrals in Cylindrical and Spherical Coordinates – Volumes.</td>
</tr>
<tr>
<td>Infinite Series – Convergence Tests.</td>
</tr>
</tbody>
</table>

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- Addison Wesley, 2006, Ch. 4-6,8,16

Supplementary Readings:

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
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

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

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:

Supplementary Readings:

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
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 perspective on various issues of engineering mechanics and dynamics, kinematics of particles, rectilinear and curvilinear motion, kinetics of particles, linear and angular motion, energy and momentum of particles, kinematics of rigid bodies in translation and curvilinear motion, forces and accelerations of plane motion for rigid bodies, energy and momentum of rigid bodies and mechanical vibration.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinematics: Rectilinear Motion of Particle.</td>
</tr>
<tr>
<td>Erratic Motion.</td>
</tr>
<tr>
<td>Curvilinear Motion of Particle: Cartesian Coordinates.</td>
</tr>
<tr>
<td>Motion of Projectiles.</td>
</tr>
<tr>
<td>Curvilinear Motion of Particle: Normal and Tangential Coordinates.</td>
</tr>
<tr>
<td>Curvilinear Motion of Particle Polar Coordinates.</td>
</tr>
<tr>
<td>Kinetics of Particle: Force and Acceleration.</td>
</tr>
<tr>
<td>Mechanical Vibration.</td>
</tr>
<tr>
<td>Circular Motion.</td>
</tr>
<tr>
<td>Impulse and Momentum.</td>
</tr>
<tr>
<td>Real Case Studies.</td>
</tr>
</tbody>
</table>

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.xav.com)
- [http://www.eidosinteractive.com](http://www.eidosinteractive.com)
- [http://www.mdyn.com](http://www.mdyn.com)
- [http://www.ams.org](http://www.ams.org)

### Reference Text:

**Supplementary Readings:**


### Assessment Scheme

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments.</td>
<td>10%</td>
</tr>
<tr>
<td>Class written Tests/Quizzes.</td>
<td>10%</td>
</tr>
<tr>
<td>Lab/Projects</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen written Mid-Term Exam (1.5-hr. Exam).</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen written Final-Exam (3-hr. Exam).</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### Assessment Pattern

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation/Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Tests and Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Lab/Projects</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Final Exam</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### Learning Unit Contact Hours Per Week

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>3 hrs/week</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1.5 hrs/week</td>
</tr>
<tr>
<td>Total class contact</td>
<td>63 hrs/semester</td>
</tr>
<tr>
<td>Total self study hours</td>
<td>45 hrs/semester</td>
</tr>
<tr>
<td>Total study hours</td>
<td>108 hrs/semester</td>
</tr>
</tbody>
</table>

### Module Leader

Staff
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Pollution</td>
</tr>
<tr>
<td>Water Pollution</td>
</tr>
<tr>
<td>Water Treatment</td>
</tr>
<tr>
<td>Electrochemistry</td>
</tr>
<tr>
<td>Chemical Processes in Petroleum Industry</td>
</tr>
<tr>
<td>Chemical Processes in Cement Industry</td>
</tr>
<tr>
<td>Chemical Processes in Polymers Industry</td>
</tr>
<tr>
<td>Chemical Processes in Glass Industry</td>
</tr>
<tr>
<td>Chemical Processes in Ceramics Industry</td>
</tr>
</tbody>
</table>

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
Reference Texts:

Supplementary Readings:

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

Assessment Pattern

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Tests and Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Laboratory Test</td>
<td>10%</td>
</tr>
<tr>
<td>Term Projects and Reports</td>
<td>10%</td>
</tr>
<tr>
<td>Unseen Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Final Exam</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

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, focusing on hazards control, safety precautions, and industrial hygiene, to develop a responsible awareness of hazards.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and Safety at work, Workshop Accidents. Electrical Hazards. Fire Protections</td>
</tr>
<tr>
<td>Workshop Measuring Equipment.</td>
</tr>
<tr>
<td>Turning machines and their elements, and cutting tools.</td>
</tr>
<tr>
<td>Milling machines and their elements, and cutters.</td>
</tr>
<tr>
<td>Grinding machines and their elements, and grinding wheels.</td>
</tr>
<tr>
<td>Drilling and Boring machines and their elements, and cutting tools.</td>
</tr>
<tr>
<td>Shaping and Planning machines and their elements, and cutting tools.</td>
</tr>
<tr>
<td>Shearing, Bending and Rolling machines.</td>
</tr>
<tr>
<td>Welding Equipment and related tools, and Electrical Connections.</td>
</tr>
<tr>
<td>Foundary Furnaces and Casting Equipment.</td>
</tr>
<tr>
<td>Wood working machines and related tools.</td>
</tr>
<tr>
<td>Pressing, Blowing, and Extrusion of polymeric machines.</td>
</tr>
</tbody>
</table>

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.
- Manufacturing Processes Video Tapes.

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

Reference Text:

Supplementary Readings:

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
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

<table>
<thead>
<tr>
<th>Topics</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using Grammatical Information in Paraphrasing</td>
<td>Unit 1 – Chapter 2</td>
</tr>
<tr>
<td>Paraphrasing</td>
<td>Unit 1 – Chapter 2</td>
</tr>
<tr>
<td>Organization Analysis</td>
<td>Unit 2 – Chapter</td>
</tr>
<tr>
<td>Organization Analysis + Outline</td>
<td>Unit 2 – Chapter</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>Unit 2 – Chapter</td>
</tr>
<tr>
<td>Memo Writing</td>
<td>Unit 2 – Chapter</td>
</tr>
<tr>
<td>Writing a Curriculum Vitae</td>
<td>Unit 3 – Chapter</td>
</tr>
<tr>
<td>News Releases</td>
<td>Unit 3 – Chapter</td>
</tr>
<tr>
<td>Writing Business Letters</td>
<td>Unit 3 – Chapter</td>
</tr>
<tr>
<td>Writing Business Reports</td>
<td>Unit 3 – Chapter</td>
</tr>
<tr>
<td>Writing Technical Reports and Giving Presentations</td>
<td>Unit 3 – Chapter</td>
</tr>
</tbody>
</table>

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

Reference Text

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%

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matrices – Matrices having Special Forms – Matrix Operations.</td>
</tr>
<tr>
<td>Determinates – Properties of Determinates.</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>Eigen Values and Eigen Vectors – Diagonalization - Orthogonal Diagonalization.</td>
</tr>
</tbody>
</table>

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 techniques.
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:

Supplementary Readings:

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%

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
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

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

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:**
- MSA Laboratory Manual.

**Supplementary Readings:**

**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
**Module Code:** ESE 253  
**Title:** Electric Circuit Analysis 1  
**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, series / 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**

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Units, Electrical Quantities, and Circuit Element:</strong> SI system of units and prefixes - the electrical quantities of charge, current, voltage, power, and energy.</td>
</tr>
<tr>
<td><strong>Laws of Circuit Analysis:</strong> Ohm’s Law, Kirchoff’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.</td>
</tr>
<tr>
<td><strong>Circuit theorems:</strong> Thevenin’s and Norton’s - conditions for maximum power transfer to a load</td>
</tr>
<tr>
<td><strong>Capacitors and Inductors:</strong> the V/I equations for capacitance or inductance – their combine in series and parallel, and calculate their stored energy.</td>
</tr>
<tr>
<td><strong>Transient Analysis in RC or RL Circuits (first and second order) :</strong> 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</td>
</tr>
</tbody>
</table>

**LAB EXPERIMENTS**
- Equipment, Voltage, Current, and Resistance
- Circuit Analysis and Design with Measurements
- Circuit Theorems Explored Experiments
- 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 theorems 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
- Laboratories
- Team projects / Paper
- Tutorials
- Class Presentations

Learning Materials

Software Requirements
- MULTISIM and MATLAB.

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

Reference Text:

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
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital and Analog Concepts</td>
</tr>
<tr>
<td>Number Systems, Operations, and Codes</td>
</tr>
<tr>
<td>Logic Gates</td>
</tr>
<tr>
<td>Boolean Algebra and Logic Simplification</td>
</tr>
<tr>
<td>Combinational Logic Analysis</td>
</tr>
<tr>
<td>Adders, Subtractors, and Comparators</td>
</tr>
<tr>
<td>Decoders, Encoders, and Code Converters</td>
</tr>
<tr>
<td>Multiplexers, De Multiplexers, and Parity Generators/Checkers</td>
</tr>
<tr>
<td>Programmable Logic Devices: SPLDs and CPLDs</td>
</tr>
<tr>
<td>VHDL Programming techniques</td>
</tr>
<tr>
<td>Field Programmable Gate Array (FPGA).</td>
</tr>
</tbody>
</table>

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 structure and function of different combinational logic circuits.

Skills
After completing this course students well be able to:
1. Design logic circuits using different approaches; either basic logic gates, universal logic gates 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. Develop programs for PLDs and FPGAs using VHDL.
5. Measure and test different types of combinational circuits.

Teaching/Learning Strategies
- Lectures
- Laboratories
Learning Materials

Useful Websites
- [http://www.msstate.edu/directory](http://www.msstate.edu/directory)

Reference Text:

Supplementary Readings:
- Hwang, E.O., *Digital Logic and Microprocessor Design with VHDL*, Lecture Notes, La Sierra University, Brooks/Cole 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
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 types used in the language, the different arithmetic operations, control structures, arrays, and functions.

SYLLABUS

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

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 computer program.
2. Debug skills using VC++ tool.
Teaching/Learning Strategies

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

Learning Materials

Software Requirements:
- Borland C++, VC++ Tools.

Useful Websites:

Reference Text:

Supplementary Readings:

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
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

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

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

**Reference Text**

**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%

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Unit Contact Hours</td>
<td></td>
</tr>
</tbody>
</table>
- 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
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.
Modeling with First Order Differential Equations.
Higher Order Ordinary Differential Equations.
Homogeneous Linear Differential Equations with constant coefficients.
Nonhomogeneous 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 techniques.
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.edu/math.odu.edu
- www.courses.cs.uiuc.edu
- www.chembio.uoguelph.ca
- www.math.montana.edu

Reference Text:

Supplementary Readings:

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
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dielectric Constant in DC and AC Fields</td>
</tr>
<tr>
<td>Local Field Correction</td>
</tr>
<tr>
<td>Sources of Polarizability</td>
</tr>
<tr>
<td>Dipolar Dispersion</td>
</tr>
<tr>
<td>Polarizability of Electrical Properties</td>
</tr>
<tr>
<td>Magnetism, Classification of Materials</td>
</tr>
<tr>
<td>Diamagnetism and its Materials</td>
</tr>
<tr>
<td>Paramagnetism and its Materials</td>
</tr>
<tr>
<td>Ferromagnetism</td>
</tr>
<tr>
<td>Superconductivity and Magnetic Fields</td>
</tr>
<tr>
<td>Perfect Diamagnetism</td>
</tr>
<tr>
<td>Electrodynamics of Superconductivity</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will 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:

Supplementary Readings:

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
**Module Code**: ESE 263  
**Title**: Electrical Circuit Analysis II  
**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

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

### LAB EXPERIMENTS

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

### 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.

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
- Laboratories
- Tutorials
- Team projects

Learning Materials

Software Requirements

- P Spice & MULTISIM

Useful Websites

- http://www.analyzethat.net

Reference Text:


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

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation/Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Tests and Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Lab/Projects</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Final Exam</td>
<td>40%</td>
</tr>
</tbody>
</table>

Total 100%

Learning Unit Contact Hours Per Week

<table>
<thead>
<tr>
<th>Component</th>
<th>Hours/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>3</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1.5</td>
</tr>
<tr>
<td>Laboritories</td>
<td>1.5</td>
</tr>
<tr>
<td>Total class contact</td>
<td>84</td>
</tr>
<tr>
<td>Total self study</td>
<td>60</td>
</tr>
<tr>
<td>Total study</td>
<td>144</td>
</tr>
</tbody>
</table>

Module Leader

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

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

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequential Logic Circuits types and operation analysis</td>
</tr>
<tr>
<td>Latches and Flip Flops: S-R, D, T, J-K</td>
</tr>
<tr>
<td>Multivibrators: Mono stable, Bistable, and Astable Multivibrators</td>
</tr>
<tr>
<td>Counters: Synchronous, Asynchronous, Up and Down, Cascadded Counters.</td>
</tr>
<tr>
<td>Finite State Machines: Mealy and Moore Finite State Machines</td>
</tr>
<tr>
<td>Memory: RAM, ROM, Cash Memory, and Flash Memory</td>
</tr>
<tr>
<td>Memory Expansion</td>
</tr>
<tr>
<td>Stacks and Ques</td>
</tr>
<tr>
<td>Digital Integrated Circuits Technologies.</td>
</tr>
</tbody>
</table>

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:


Supplementary Readings:

- Hwang, E.O., *Digital Logic and Microprocessor Design with VHDL*, Lecture Notes, La Sierra University, Brooks/Cole 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

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation/Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Tests and Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Lab/Projects</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Final Exam</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Learning Unit Contact Hours Per Week

<table>
<thead>
<tr>
<th>Component</th>
<th>Hours Per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>3 hrs/week</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1.5 hrs/week</td>
</tr>
<tr>
<td>Laboratories</td>
<td>1.5 hrs/week</td>
</tr>
<tr>
<td>Total class contact</td>
<td>84 hrs/semester</td>
</tr>
<tr>
<td>Total self study hours</td>
<td>60 hrs/semester</td>
</tr>
<tr>
<td>Total study hours</td>
<td>144 hrs/semester</td>
</tr>
</tbody>
</table>

Module Leader

Staff
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Dimensional Arrays.</td>
</tr>
<tr>
<td>Structures and Arrays of Structures.</td>
</tr>
<tr>
<td>Pointers.</td>
</tr>
<tr>
<td>Classes Usage and Declaring.</td>
</tr>
<tr>
<td>Objects as Function Arguments.</td>
</tr>
<tr>
<td>Operator Overloading.</td>
</tr>
<tr>
<td>Inheritance.</td>
</tr>
</tbody>
</table>

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 medium-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 methodologies (OOP).

Teaching/Learning Strategies
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentation.

Learning Materials

Software Requirements:
- Borland C++, VC++ Tools.

Useful Websites:

Reference Text:
Supplementary Readings:

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%

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
</tr>
</thead>
</table>

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
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles of Project Management.</td>
</tr>
<tr>
<td>Project Planning Phase.</td>
</tr>
<tr>
<td>Structure of Networks.</td>
</tr>
<tr>
<td>Duration Time Estimates: Deterministic and Probabilistic.</td>
</tr>
<tr>
<td>Project Scheduling Phase .</td>
</tr>
<tr>
<td>Basic Scheduling Computations.</td>
</tr>
<tr>
<td>Slack Time Computation, Critical Path Identification</td>
</tr>
<tr>
<td>Project Control Phase.</td>
</tr>
<tr>
<td>Resource Constraints &amp; leveling.</td>
</tr>
<tr>
<td>Time-Cost Trade-Off &amp; Crashing.</td>
</tr>
<tr>
<td>Real Case Study.</td>
</tr>
</tbody>
</table>

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 management phases through real case studies.
3. Planning to communicate potentialities and strategies for resolving issues which occur during the project.
Teaching/Learning Strategies

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

Learning Materials

Software Requirements:
- Win QSB, MS Project 2003.

Useful Websites:
- http://www.csiwin.com
- http://www.jsaproj.com
- http://www.arch.uiuc.edu
- http://www.criticaltools.com

Reference Text:

Supplementary Readings:

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
AIMS
This module is designed to introduce students to Fourier and Laplace Transforms. It also enables students to analyze 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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vector Fields- Gradient Fields- Divergence and curl- Laplacian operator</td>
</tr>
<tr>
<td>Laplace Transform ( Definition – Laplace transform of elentary functions- Properties- Inverse Laplace Transform- Convolution Theorem) - Fourier Analysis -Fourier Transform</td>
</tr>
<tr>
<td>Introduction to Complex variables and Complex functions.</td>
</tr>
<tr>
<td>Interpolation – Newton's Divided–Difference Interpolating Polynomials – Lagrange Interpolating polynomials.</td>
</tr>
<tr>
<td>Numerical Differentiation – High-Accuracy Differentiation – Formulas.</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this module, students will be able to:
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 techniques.
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
Reference Text:

Supplementary Readings:

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
### 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

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

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

**Learning Materials**

**Useful Websites**

- [http://www.lemps.ch](http://www.lemps.ch)
- [http://www.swtpe.com](http://www.swtpe.com)
- [http://www.chiark.greenend.org.uk](http://www.chiark.greenend.org.uk)
Reference Text:

Supplementary Readings:
- IEEE Computer 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
- Laboratoried 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
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction.</td>
</tr>
<tr>
<td>Basic Physics of Semiconductors.</td>
</tr>
<tr>
<td>Diode Models and Circuits.</td>
</tr>
<tr>
<td>Physics of Bipolar Junction Transistors (BJT), characteristics,</td>
</tr>
<tr>
<td>operation, analysis of different configurations and applications.</td>
</tr>
<tr>
<td>Physics of Field Effect Transistors (FET) Transistors,</td>
</tr>
<tr>
<td>characteristics, operation, analysis of different configurations and</td>
</tr>
<tr>
<td>applications.</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will 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 will be able to:
1. Differentiate 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.
- Tutorials.
- Laboratories.
- Group Project / Term Paper.
Learning Materials

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

Reference Text:

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

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

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyze the efficiency of algorithms.</td>
</tr>
<tr>
<td>Recursion functions (implementation and usage).</td>
</tr>
<tr>
<td>Implement a list class.</td>
</tr>
<tr>
<td>Implement a Stack and queues.</td>
</tr>
<tr>
<td>Design of generic classes.</td>
</tr>
<tr>
<td>Recursion functions.</td>
</tr>
<tr>
<td>Searching and sorting algorithms.</td>
</tr>
<tr>
<td>Trees representation.</td>
</tr>
<tr>
<td>Binary search trees</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Explain in depth the different algorithms for data structure manipulation.
2. Demonstrate different sort and search algorithms and the optimum search algorithm.
3. Illustrate the use of recursion and recursion functions.
4. Categorize the classes of problems according to complexity theory.
5. Illustrate the use of different data compression techniques for files.

Skills
After completing this course students will be able to:
1. The ability to analyze and select the best algorithm that suits a problem.
2. The ability to build a robust computer program that will not crash for unexpected input.
3. The ability to expertly debug complicated algorithms and programs.
4. The ability to examine predefined algorithms and understand them.
5. A positive contribution to group (team) working.

Teaching/Learning Strategies
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.
Learning Materials

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

Reference Text:

Supplementary Readings:

Software Requirements
- VC++, or any other programming language.

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

Assessment Pattern
- Class Participation 5%
- Assignments 5%
- Tests and Quizzes 10%
- Projects and Reports 20%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
</tr>
</thead>
</table>

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:
CS Staff
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**

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

**LEARNING OUTCOMES**

**Knowledge**
After completing this course students will be able to:
1. Analyze data communication and computer networks, both from theoretical and practical aspects.
2. Differentiate different 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](http://www.sff.net/people/jeff.hecht/history.html)

#### Reference Text:

#### Supplementary Readings:
- IEEE Communications magazine, releases 2000 and up.

### 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

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation/Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Tests and Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Final Exam</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### 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
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

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

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
- 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
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation of Data.</td>
</tr>
<tr>
<td>Measures of Central Tendency.</td>
</tr>
<tr>
<td>Measures of Dispersion.</td>
</tr>
<tr>
<td>Fundamentals of Probability.</td>
</tr>
<tr>
<td>Discrete Probability Distributions: Binomial &amp; Poisson</td>
</tr>
<tr>
<td>Continuous Probability Distributions: Uniform, Exponential &amp; Normal.</td>
</tr>
<tr>
<td>Sampling Distribution.</td>
</tr>
<tr>
<td>Random processes and cross correlation</td>
</tr>
<tr>
<td>Confidence Limits &amp; Confidence Interval.</td>
</tr>
<tr>
<td>Significance Testing Hypotheses: $X^2$-test &amp; Goodness of Fit Test.</td>
</tr>
<tr>
<td>Correlation : Measurement, &amp; Coefficients.</td>
</tr>
<tr>
<td>Regression Analysis and Least Squares Method.</td>
</tr>
</tbody>
</table>

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 decisions.
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. Develop 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:

Supplementary Readings:

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

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

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Microcontrollers</td>
</tr>
<tr>
<td>Microprocessors vs. Microcontrollers</td>
</tr>
<tr>
<td>Internal Structure of Microcontrollers</td>
</tr>
<tr>
<td>Interfacing Techniques: Serial and parallel interfaces</td>
</tr>
<tr>
<td>Instruction set and Assembly Language Programming</td>
</tr>
<tr>
<td>Timer Operations and Inturrupts</td>
</tr>
<tr>
<td>Microcontroller Programming using: Assembly language, C-Language, Basic-Language</td>
</tr>
<tr>
<td>Design and Interface Examples</td>
</tr>
<tr>
<td>Microcontroller-based system projects</td>
</tr>
</tbody>
</table>

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
- Laboratories
- Tutorials
- Individual/Group Project

**Learning Materials**

**Useful Websites**

**Reference Text:**

**Supplementary Readings:**

**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
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction.</td>
</tr>
<tr>
<td>BJT Frequency Response.</td>
</tr>
<tr>
<td>BJT Singal Stage Amplifiers.</td>
</tr>
<tr>
<td>MOS Frequency Response</td>
</tr>
<tr>
<td>MOS Single Stage Amplifiers.</td>
</tr>
<tr>
<td>Current Mirror</td>
</tr>
<tr>
<td>Multistage Amplifiers.</td>
</tr>
</tbody>
</table>

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 will be able to:

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

Skills
After completing this course students will be able to:

1. Design and implement electronic circuits with different solid state components.
2. Measure and test various electronic circuits.
3. Draw and analyze the frequency response of various electronic circuits.

### Teaching/Learning Strategies
- Lectures.
- Tutorials.
- Laboratories.
- Team Projects / Term Paper.

### Learning Materials

#### Useful Websites
- [http://www.web-ee.com](http://www.web-ee.com)

#### Reference Text:

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

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating-System Structures.</td>
</tr>
<tr>
<td>Process Management.</td>
</tr>
<tr>
<td>CPU Scheduling.</td>
</tr>
<tr>
<td>Process Synchronization.</td>
</tr>
<tr>
<td>Deadlocks.</td>
</tr>
<tr>
<td>Memory Management.</td>
</tr>
<tr>
<td>Virtual Memory.</td>
</tr>
<tr>
<td>File System interface.</td>
</tr>
<tr>
<td>File System Implementation.</td>
</tr>
<tr>
<td>Mass Storage Structure.</td>
</tr>
<tr>
<td>I/O Systems.</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Demonstrate the structure and functions of an operating system.
2. Illustrate the methods of process management, CPU scheduling and process synchronization.
3. Characterize what is deadlocks and how they are handled.
4. Describe memory organization and explain memory management techniques.
5. Compare between different operating systems.

Skills
After completing this course students will be able to:
1. Expertly use any operating system environment. (6)
2. Create any operating system component. (7)
3. Solve some of the common operating systems problems such as: deadlock, synchronization…etc.
### Teaching/Learning Strategies
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

### Learning Materials

#### Reference Text:

#### Supplementary Readings:

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

### Assessment Pattern
- Class Participation 5%
- Assignments 5%
- Tests and Quizzes 10%
- Projects and Reports 20%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
</tr>
</thead>
</table>

### 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:
CS Staff
# 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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classification of signals and systems</td>
</tr>
<tr>
<td>Signal operations</td>
</tr>
<tr>
<td>Properties of linear systems</td>
</tr>
<tr>
<td>System response</td>
</tr>
<tr>
<td>Classical solutions of differential equations</td>
</tr>
<tr>
<td>Continuous and discrete convolution</td>
</tr>
<tr>
<td>Time-domain model of systems: differential equations-transfer function – state space equations</td>
</tr>
<tr>
<td>Fourier series and Fourier transforms: trigonometric – exponential-spectral contents-properties-application to modulation and demodulation</td>
</tr>
<tr>
<td>Fourier analysis of continuous-time systems: response of periodic and aperiodic inputs-analysis of ideal filters</td>
</tr>
<tr>
<td>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</td>
</tr>
</tbody>
</table>

## 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](http://www.links.math.rpi.edu)
Reference Text:
- B.P. Lathi, Signal processing and linear systems, Berkeley Cambridge Press, 2000

Supplementary Readings:

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
**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**

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Networks: Network Services, Network Topologies, Circuit Switching and Packet Switching.</td>
</tr>
<tr>
<td>Computer Networks: Layered Architecture- Concept of Layering, OSI Model.</td>
</tr>
<tr>
<td>The Data Link Layer (DLC) : Error Control, ARQ, Framing - Medium Access Control Protocols - ALOHA, CSMA, LANs.</td>
</tr>
<tr>
<td>Packet Switching &amp; the Network Layer : Datagram and Virtual Circuit Switching, Network Layer Functions, Routing Algorithms</td>
</tr>
<tr>
<td>ATM and TCP/IP Networks</td>
</tr>
<tr>
<td>Telephone Networks: Network Elements, Multiplexing, Switching, Signaling, Traffic Analysis, Cellular Networks</td>
</tr>
</tbody>
</table>

**LEARNING OUTCOMES**

**Knowledge**
After completing this course students will 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 will 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  
- Laboratories  
- Tutorials  
- Individual/Group Project

**Learning Materials**

**Useful Websites**
- [http://www.engr.wisc.edu/](http://www.engr.wisc.edu/)
Reference Text:

Supplementary Readings:

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
Module Code : CSE 451
Title : Object Oriented Programming
Level : 4
Credit Hours : 3
Prerequisites : CSE354

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

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Preliminaries Evolution of the Major Programming Languages</td>
</tr>
<tr>
<td>• Bindings.</td>
</tr>
<tr>
<td>• Type Checking and Scopes Data types Expressions and the</td>
</tr>
<tr>
<td>• Statement-Level Control Structures.</td>
</tr>
<tr>
<td>• Implementing Subprograms.</td>
</tr>
<tr>
<td>• Abstract Data Types Concurrency.</td>
</tr>
<tr>
<td>• Exception Handling.</td>
</tr>
<tr>
<td>• Functional Programming Languages.</td>
</tr>
<tr>
<td>• Logic Programming Languages.</td>
</tr>
<tr>
<td>• Object-Oriented Programming Languages.</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Illustrate the basic components of a programming language.
2. Categorize different programming languages considering abstraction, syntax, semantics, binding times, data and sequence control, run-time resources, translators and storage.

Skills
After completing this course students well be able to:
1. Differentiate between different programming languages.
2. Select the appropriate programming language for a given programming problem.
3. Learn any programming language faster and easier.
4. Use different programming languages to solve a programming problem.

Teaching/Learning Strategies
• Lectures.
• Tutorials.
• Computer Laboratories.
• Class Presentations.
**Learning Materials**

**Reference Text:**

**Supplementary Readings:**

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

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

<table>
<thead>
<tr>
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<th>100%</th>
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<tbody>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
<tr>
<td>Learning Unit Contact Hours</td>
<td></td>
</tr>
<tr>
<td>Lectures</td>
<td>3 hrs / week</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1.5 hrs / week</td>
</tr>
<tr>
<td>Total class contact hours</td>
<td>63 hrs/semester</td>
</tr>
<tr>
<td>Total self study hours</td>
<td>45 hrs/semester</td>
</tr>
<tr>
<td>Total study hours</td>
<td>108 hrs/semester</td>
</tr>
</tbody>
</table>

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

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Introduction to software engineering</td>
</tr>
<tr>
<td>• Socio-technical systems and Critical systems</td>
</tr>
<tr>
<td>• Software processes</td>
</tr>
<tr>
<td>• Agile, Extreme and other design methodologies</td>
</tr>
<tr>
<td>• Critical systems specification</td>
</tr>
<tr>
<td>• Architectural design</td>
</tr>
<tr>
<td>• Distributed systems architecture</td>
</tr>
<tr>
<td>• Rapid software development</td>
</tr>
<tr>
<td>• Verification and validation</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Illustrate different software methodologies such as extreme, agile and others and the corresponding software development lifecycle.
2. Demonstrate systems modelling, analysis and design across both architectural and behavioural specifications.
3. Critically appraise principles and techniques for the engineering of large software projects.
4. Demonstrate techniques and tools to support configuration management.
5. Explain different categories of software metrics and estimation methods.

Skills
After completing this course students will be able to:
1. Apply the appropriate software design methodologies to the process of developing large software systems.
2. Develop formal specifications from informal requirements of software systems.
3. Apply techniques for scheduling and control of large projects.

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

**Teaching/Learning Strategies**
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

**Learning Materials**

**Useful Websites:**
- [http://www.ipd.uka.de/~tichy/patterns/overview.html](http://www.ipd.uka.de/~tichy/patterns/overview.html)

**Reference Text:**

**Supplementary Readings:**

**Software Requirements**
- CASE tools such as Rational Rose, Oracle Designer

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

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

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
</tr>
</thead>
</table>

**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:**
CS Staff
Module Code : CSE 4531
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, to improve his/her practical background in control systems, to use engineering software as MATLAB and SIMULINK, and to strengthen his/her practical skills in different electronic areas that might have been neglected and to improve his/her technical writing style. Lectures are designed according to the need of the projects.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical circuits including: Analog electronics, Digital electronic, and Control systems</td>
</tr>
<tr>
<td>Software application: MATLAB, MULTISIM</td>
</tr>
</tbody>
</table>

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 o check the functionality of electronic circuits.
3. Use data sheet for components he/she did not use before.
4. Learn how to write conclusions in technical reports provided with experimental verification.

Teaching/Learning Strategies
- Review and discussion sessions
- Individual/Group Project
- Laboratories
Learning Materials

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

Reference Text:
- No specific reference book

Supplementary Readings:
- Scientific papers
- Engineering manuals
- Technical catalogues

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

Assessment Pattern
- 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 6 hrs / week
- Total class contact hours 84 hrs/semester
- Total self study hours 66 hrs/semester
- Total study hours 150 hrs/semester

Module Leader:
Staff
**Module Outline**

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

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

**SYLLABUS**

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Structures.</td>
</tr>
<tr>
<td>Distributed System Structures.</td>
</tr>
<tr>
<td>Distributed File Systems.</td>
</tr>
<tr>
<td>Protection.</td>
</tr>
<tr>
<td>Security.</td>
</tr>
<tr>
<td>Fault Tolerance.</td>
</tr>
<tr>
<td>Client/Server processing and Object Orientation.</td>
</tr>
</tbody>
</table>

**LEARNING OUTCOMES**

**Knowledge**  
*After completing this course students will be able to:*

1. Demonstrate basic concepts commonly used in network operating systems and network programming.
2. Critically appraise the advantages and limitations of peer to peer and server based NOS's.
3. Categorize and appraise security and protection techniques.
4. Discuss advanced features of OS such as client/server processing, object orientation and fault tolerance.

**Skills**  
*After completing this course students will be able to:*

1. Provide a critical analysis of commercially produced NOSs from the perspective of suitability for various applications.
2. Select, implement and manage NOSs.
3. Select NOS suitable for a particular application.
Teaching/Learning Strategies  
- Lectures.  
- Tutorials.  
- Computer Laboratories.  
- Class Presentations.

Learning Materials

Required Software
Visual C++, UNIX system, Java

Useful Websites
- www.redhat.com
- http://www.linux.org/

Reference Text:

Supplementary Readings:

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

Assessment Pattern
- Class Participation 10%
- Assignments 10%
- Tests and Quizzes 10%
- Projects and Reports 10%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

Total 100%

Learning Unit Contact Hours
- Lectures 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:  
CS Staff
MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code: ECE 4533
Title: Robot Dynamics & Control
Level: 4
Credit Hours: 3
Prerequisites: ECE 363

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

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rigid motions and homogeneous transformations</td>
</tr>
<tr>
<td>Forward and inverse kinematics</td>
</tr>
<tr>
<td>Velocity kinematics</td>
</tr>
<tr>
<td>Path and trajectory planning</td>
</tr>
<tr>
<td>Dynamics</td>
</tr>
<tr>
<td>Independent joint control</td>
</tr>
<tr>
<td>Multivariable control</td>
</tr>
<tr>
<td>Force control</td>
</tr>
<tr>
<td>Geometric nonlinear control</td>
</tr>
<tr>
<td>Computer vision</td>
</tr>
<tr>
<td>Vision-based control</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will 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 will 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:

Supplementary Readings:

Assessment Scheme
- Weekly Written Assignments (12 Assignments).
Class Written Tests (2.5-hr Tests)
Individual/Team Course Project
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 15%
- Projects and Reports 10%
- Mid-Term Exam 20%
- 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
Module Code : CSE 4534
Title : File Access and Management
Level : 4
Credit Hours : 3
Prerequisites : CSE354

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

SYLLABUS

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

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Explain how the computer hardware and system software affects file structure.
2. Classify types of data structures used in creating files.
3. Discuss the algorithms for data file sorting and searching.
4. Acquire the foundation for studying, implementing, and effectively using database systems.

Skills
After completing this course students will be able to:
1. Adapt the students' knowledge of file structures to a variety of languages and peripheral storage technology.
2. Design and implement effective file structures and associated software from small to very large and complex systems.
3. Implement effective file search and sort algorithms.
Teaching/Learning Strategies
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Required Software
C++, Pascal.

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

Reference Text:

Supplementary Readings:
- Data Structures and Algorithm Analysis in C++, 2nd ed. by Mark Allen Weiss, Addison-Wesley, 1998
- Data Structures and Algorithms with Object-Oriented Design Patterns in C++, by Bruno R. Preiss, John Wiley & Sons, 1998
- Data Structures and Other Objects Using C++, 2nd ed. by Michael Main, Walter Savitch, Addison-Wesley, 2000
- Data Structures and Problem Solving Using Java, 2nd ed. by Mark Allen Weiss, Addison-Wesley, 2001

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

Assessment Pattern
- Class Participation 10%
- Assignments 10%
- Tests and Quizzes 10%
- Projects and Reports 10%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

Total 100%

Learning Unit Contact Hours
- Lectures 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

<table>
<thead>
<tr>
<th>Module Code</th>
<th>: CSE 454</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>: Systems Analysis and Design</td>
</tr>
<tr>
<td>Level</td>
<td>: 4</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>: 3</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>: CSE354</td>
</tr>
</tbody>
</table>

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

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Development Environment.</td>
</tr>
<tr>
<td>Initiating and Planning Systems Development Projects.</td>
</tr>
<tr>
<td>Information gathering techniques.</td>
</tr>
<tr>
<td>Determining Systems Requirements.</td>
</tr>
<tr>
<td>Structuring System Requirements: Process Modelling and Data flow</td>
</tr>
<tr>
<td>Structuring System Requirements: Logic Modelling and Entity</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Define and differentiate between the concepts of system life cycle, development methodology and system modelling.
2. Illustrate the basic system modelling perspectives and the related modelling primitives.
3. Demonstrate the main features of structured system modelling perspectives, and their advantages.
4. Identify the advantages and limitations of different development methodologies.

Skills
After completing this course students will be able to:
1. Apply the structured system analysis and design techniques to project development and prepare a set of document for the analysis, design and test phases of a project.
2. Carry out the tasks of information gathering, cataloguing and documenting.
3. Apply the concepts of data modelling, Process modelling, and Logic Modelling to a software development project.

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

**Teaching/Learning Strategies**

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

**Learning Materials**

**Useful Websites**

- [http://otn.oracle.com/](http://otn.oracle.com/)
- [www.uml.org](http://www.uml.org)
- [www.comp.glam.ec.uk](http://www.comp.glam.ec.uk)

**Reference Text:**


**Supplementary Readings:**


**Software Requirements**

- Oracle Designer

**Assessment Scheme**

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

**Assessment Pattern**

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

| Total | 100% |

**Learning Unit Contact Hours**

- Lectures 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:**

CS Staff
## Module Outline

<table>
<thead>
<tr>
<th>Module Code</th>
<th>:ECE 455</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Automatic Control Systems</td>
</tr>
<tr>
<td>Level</td>
<td>4</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>3</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>:ECE 356</td>
</tr>
</tbody>
</table>

### AIMS
This module is designed to enable students to analyze concepts in the different control design techniques, State-Space representation, Dynamic systems, Electromechanical Systems, Analyzing the performance of control systems either in open loop or closed loop, Transient-response analysis and steady state error analysis, Basic control actions (P, I, D), Lead and Lag compensators, frequency response and root locus methods, State space analysis and design.

### SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction to Control Systems:</strong> Practical issues and control system design, open loop and closed loop with advantages and disadvantages</td>
</tr>
<tr>
<td><strong>System modeling:</strong> Transfer function representation, State space representation of dynamic systems, Electromechanical Systems - Transfer function and block diagram reduction</td>
</tr>
<tr>
<td><strong>Time response specifications and analysis:</strong> Transient response analysis and design, Error analysis and design.</td>
</tr>
<tr>
<td><strong>Control system stability analysis:</strong> Routh criterion and design, Root locus.</td>
</tr>
<tr>
<td><strong>Frequency Response Analysis and design:</strong> Bode diagram – gain margin and phase margin</td>
</tr>
<tr>
<td><strong>Design and compensation:</strong> Reduction of parameter variations using feedback, Lead-Lag compensators, PID compensators – compensation design using Bode diagram and root locus.</td>
</tr>
<tr>
<td><strong>Stat Space Design and Analysis with Compensation:</strong> Pole placement design</td>
</tr>
</tbody>
</table>

### LAB EXPERIMENTS
Use 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. Identify 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 Control design procedures

#### Skills

**After completing this course students will be able to:**
1. Link the industrial real systems with the control theory (formulate the problem, derive the mathematical model, analyze the open loop performance and motivate them implement the controller, evaluate its performance with the system to be controlled)
2. Carry on the design, implement it and evaluate its performance using the up-to-date design packages MATLAB® and Simulink with different Toolboxes, especially the control toolbox controller design, design the controller using the available technique.

### Teaching/Learning Strategies

- Lectures
- Tutorials
- Laboratories
- Individual/Group Project

### Learning Materials

#### Useful Websites
- [http://www.engr.wisc.edu/](http://www.engr.wisc.edu/)

#### Reference Text:

#### Supplementary Readings:

### Assessment Scheme

- Weekly Written Assignments (6 home Assignments).
- Class Written Tests (2 0.5-hr Tests)
- Individual/Team Course Project
- Unseen Written Mid-Term Exam (1.5-hr. Exam).
- Unseen Written Final-Exam (3-hr. Exam).

#### Assessment Pattern

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Class Participation</td>
<td>5%</td>
</tr>
<tr>
<td>Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Tests and Quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Projects and Lab</td>
<td>15%</td>
</tr>
<tr>
<td>Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Total 100%**

### Learning Unit Contact Hours

<table>
<thead>
<tr>
<th>Component</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>3 hrs/week</td>
</tr>
<tr>
<td>Tutorials &amp; Laboratories</td>
<td>1.5 hrs/week</td>
</tr>
<tr>
<td>Total class contact hours</td>
<td>63 hrs/semester</td>
</tr>
<tr>
<td>Total self study hours</td>
<td>45 hrs/semester</td>
</tr>
<tr>
<td>Total study hours</td>
<td>108 hrs/semester</td>
</tr>
</tbody>
</table>

### Module Leader

Staff
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of Digital Logic Circuits</td>
</tr>
<tr>
<td>Register Transfer and Micro Operations</td>
</tr>
<tr>
<td>Basic Computer Organization and Design</td>
</tr>
<tr>
<td>Arithmetic Logic Unit</td>
</tr>
<tr>
<td>Hardwired Control Unit</td>
</tr>
<tr>
<td>Assembly Language of the Basic Computer</td>
</tr>
<tr>
<td>Microprogrammed Control Unit</td>
</tr>
<tr>
<td>Central Processing Unit</td>
</tr>
<tr>
<td>Operating Systems</td>
</tr>
<tr>
<td>Input/Output Organization</td>
</tr>
<tr>
<td>Memory Organization</td>
</tr>
</tbody>
</table>

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.bizrate.com)
- [http://www.dell.com](http://www.dell.com)

### Reference Text:
- Supplementary Readings:
- IEEE computer 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

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation/Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Tests and Quizzes</td>
<td>20%</td>
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<tr>
<td>Unseen Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Unseen Final Exam</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

## Learning Unit Contact Hours Per Week

<table>
<thead>
<tr>
<th>Component</th>
<th>Hours/Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>3</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1.5</td>
</tr>
<tr>
<td>Total class contact hours</td>
<td>63</td>
</tr>
<tr>
<td>Total self study hours</td>
<td>45</td>
</tr>
<tr>
<td>Total study hours</td>
<td>108</td>
</tr>
</tbody>
</table>

## Module Leader

Staff
Module Code: CSE 461
Title: Computer Security
Level: 4
Credit Hours: 3
Prerequisites: ECE366 + CSE364

AIMS
This module addresses the problem of securing computer systems. Different levels of computer threats and different authentication methods are studied. Ciphering and cryptographic techniques are studied to create secure algorithms. In addition, web security is introduced for the student to be aware of the different security techniques used at present.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview of Cryptography,</td>
</tr>
<tr>
<td>Mathematical Background, Number-Theoretic Reference Problems,</td>
</tr>
<tr>
<td>Public-Key Parameters,</td>
</tr>
<tr>
<td>Pseudorandom Bits and Sequences,</td>
</tr>
<tr>
<td>Stream Ciphers, Block Ciphers,</td>
</tr>
<tr>
<td>Public-Key Encryption,</td>
</tr>
<tr>
<td>Hash Functions and Data Integrity,</td>
</tr>
<tr>
<td>Identification and Entity Authentication,</td>
</tr>
<tr>
<td>Digital Signatures,</td>
</tr>
<tr>
<td>Key Establishment Protocols,</td>
</tr>
<tr>
<td>Key Management Techniques,</td>
</tr>
<tr>
<td>Web Security.</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Appraise the different levels of computer threats.
2. Differentiate between security, privacy and integrity.
3. Characterize ciphering and cryptology.
4. Illustrate the concepts of digital signature and Public or Private Key.
5. Discriminate between different authentication methods used for access control in computer systems.

Skills
After completing this course students will be able to:
1. Implement digital signature and Public or Private Key.
2. Apply key management techniques.
3. Propose, apply and evaluate security, privacy and integrity policies for a system.
4. Choose and implement the appropriate ciphering and cryptographic techniques.

5. Implement different authentication methods.

**Teaching/Learning Strategies**
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

**Learning Materials**

**Useful Websites:**
- www.rfc.org

**Reference Text:**

**Supplementary Readings:**

**Software Requirements**
- VC++, Java

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

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

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
</tr>
</thead>
</table>

**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:**
CS Staff
Module Code : CSE 462  
Title : Fundamentals Of Database Systems  
Level : 4  
Credit Hours : 3  
Prerequisites : CSE 454

**AIMS**
This module introduces the basic concepts in database system and its architecture. It discusses the different models and different levels of abstractions. Then it introduces the entity-relationship model as a conceptual modelling technique. The main subject of the module is the relational database model, languages and systems.

**SYLLABUS**

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Databases and Database users</td>
</tr>
<tr>
<td>• Database system concepts and architecture</td>
</tr>
<tr>
<td>• Data modelling using the entity-relationship model</td>
</tr>
<tr>
<td>• The relational data model, relational constraints, and the relational</td>
</tr>
<tr>
<td>• Fundamentals of SQL.</td>
</tr>
<tr>
<td>• The relational database standard ER and EER to relational mapping</td>
</tr>
<tr>
<td>• Concepts for object – oriented databases</td>
</tr>
</tbody>
</table>

**LEARNING OUTCOMES**

**Knowledge**

*After completing this course students will be able to:*

1. Demonstrate the concepts of database management systems.
2. Explain and appreciate the underlying theory, such as mathematics and logic, relevant to database design, development and evaluation.
3. Illustrate the relational model using entity relationship diagram (ERD).
4. Illustrate the elements and syntax of the SQL language and explain their use.

**Skills**

*After completing this course students will be able to:*

1. Model business data using entity relationship diagram (ERD), transform it to the relational model and apply normalization and integrity rules to it.
2. Use any implementation of the SQL language for data manipulation.
3. Use an R-DBMS (e.g. ORACLE) to implement a relational database schema, a database application, and execute queries.

**Teaching/Learning Strategies**

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

Reference Text:

Supplementary Readings:
- An Introduction to Database Systems, 8th ed. by C. J. Date, Addison-Wesley, 2008.

Software Requirements:
- Oracle Designer

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

Assessment Pattern
- Class Participation 5%
- Assignments 5%
- Tests and Quizzes 10%
- Projects and Reports 20%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

Total 100%

Learning Unit Contact Hours
- Lectures 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:
CS Staff
Module Code : CSE 4631
Title : Cryptography
Level : 4
Credit Hours : 3
Prerequisites : CSE 451

AIMS
This module is designed to provide students with a foundation of cryptography in an applied manner so that students can grasp its importance in relation to the rest of information security. The course covers principles of number theory and 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. Cryptanalytic methods (known, chosen plaintext etc.) for secret and public key schemes

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction; History of Cryptography; Steganography.</td>
</tr>
<tr>
<td>Cryptology and simple cryptosystems; Shift, Affine, Hill Ciphers; Enigma</td>
</tr>
<tr>
<td>Conventional encryption techniques; Stream and block ciphers; DES;</td>
</tr>
<tr>
<td>DES continued; Linear and Differential Cryptanalysis; Hash functions;</td>
</tr>
<tr>
<td>More on Block Ciphers; The Advanced Encryption Standard</td>
</tr>
<tr>
<td>Hash Functions and their Implementation</td>
</tr>
<tr>
<td>Number Theory and Algorithm Complexity; Public Key Encryption - RSA</td>
</tr>
<tr>
<td>Public key Encryption using Discrete Logarithms</td>
</tr>
<tr>
<td>Elliptic Curve Cryptography</td>
</tr>
<tr>
<td>Digital signatures and the digital signature standard</td>
</tr>
<tr>
<td>Key Management Schemes</td>
</tr>
<tr>
<td>Identification Schemes and Biometrics</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Grasp the importance of cryptography in relation to the rest of information security
2. Understand principles of number theory and cryptographic algorithms and cryptanalysis
3. Learn how various cryptographic schemes work

Skills
After completing this course students will 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/](http://www.engr.wisc.edu/)

**Reference Text:**

**Supplementary Readings:**

### Assessment Scheme
- Weekly Written Assignments (12 Assignments).
- Class Written Tests (2.5-hr Tests)
- Individual/Team Course Project
- Unseen Written Mid-Term Exam (1.5-hr. Exam).
- Unseen Written Final-Exam (3-hr. Exam).

### Assessment Pattern

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation</td>
<td>5%</td>
</tr>
<tr>
<td>Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Tests and Quizzes</td>
<td>15%</td>
</tr>
<tr>
<td>Projects and Reports</td>
<td>10%</td>
</tr>
<tr>
<td>Mid-Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
</tr>
</tbody>
</table>

**Total** 100%

### Learning Unit Contact Hours

<table>
<thead>
<tr>
<th>Component</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>3 hrs/week</td>
</tr>
<tr>
<td>Tutorials</td>
<td>1.5 hrs/week</td>
</tr>
<tr>
<td>Total class contact hours</td>
<td>63 hrs/semester</td>
</tr>
<tr>
<td>Total self study hours</td>
<td>45 hrs/semester</td>
</tr>
<tr>
<td>Total study hours</td>
<td>108 hrs/semester</td>
</tr>
</tbody>
</table>

### Module Leader:
- Staff
AIMS
This module introduces the field of human computer interaction with emphasis on its impact on software design. It provides the student with theories and models of the way users think and work to guide the students to best design the interface to suite users’ preferences. It provides an understanding of the underlying processes of human perception, information processing, and demonstrates their relevance to user interface design. Students will learn how to apply mechanisms such as feedback, user support, navigation aids and good screen design in constructing interface designs that match users' needs. Students will also learn techniques for evaluating user interface designs that are grounded in theory.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is Interaction Design?</td>
</tr>
<tr>
<td>Understanding and Conceptualizing Interaction</td>
</tr>
<tr>
<td>Understanding Users</td>
</tr>
<tr>
<td>Interfaces and Interactions</td>
</tr>
<tr>
<td>The Process of Interaction Design</td>
</tr>
<tr>
<td>Design, Prototyping and Construction</td>
</tr>
<tr>
<td>Design Evaluation: Usability Testing, Field Studies and Analytical Evaluation</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Differentiate between the different scientific fields involved in interaction design.
2. Illustrate the principles and the applications of ID design goals, usability goals, user experience etc.
3. Analyze how much the theories of how people communicate and work can influence the design of interactive systems.
4. Illustrate the different methodologies used in interface design and users involvement.

Skills
After completing this course students will be able to:
1. Select models that are appropriate to particular design problems and contexts and justify those choices.
2. Apply standard usability evaluation techniques to evaluate and critique designs from a usability perspective, and to propose improvements.
3. Design interactive systems that are usable and meet the users' needs.
Teaching/Learning Strategies
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Reference Text:
- Interaction Design: Beyond Human-Computer Interaction, 2nd ed. by Helen Sharp, Yvonne Rogers, and Jenny Preece, Wiley Mar 23, 2007

Supplementary Readings:
- Designing for Interaction: Creating Smart Applications and Clever Devices (VOICES) by Dan Saffer Peachpit Press, Jul 28, 2006

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

Assessment Pattern
- Class Participation 10%
- Assignments 10%
- Tests and Quizzes 10%
- Projects and Reports 10%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

Total 100%

Learning Unit Contact Hours
- Lectures 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:
CS Staff
Module Code: CSE 4633
Title: Theory of Computing
Level: 4
Credit Hours: 3
Prerequisites: CSE 354

AIMS
This module is an introduction to Computer Science Theory. Topics covered include the basics of the Automata Theory and the Theory of Grammars, to design language definers, differentiate between different statements and different languages.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Languages and Grammars.</td>
</tr>
<tr>
<td>Deterministic and Nondeterministic Finite Automata (DFA and NFA).</td>
</tr>
<tr>
<td>Equivalence between DFA and NFA.</td>
</tr>
<tr>
<td>Introduction to Regular Expressions.</td>
</tr>
<tr>
<td>Equivalence between Regular Expressions and NFA.</td>
</tr>
<tr>
<td>Closure Properties of Regular Languages.</td>
</tr>
<tr>
<td>Pumping Lemma and non-regular Languages.</td>
</tr>
<tr>
<td>Introduction to Context-free Grammars and Languages. Derivations</td>
</tr>
<tr>
<td>Trees and Parsing.</td>
</tr>
<tr>
<td>Transforming Grammars. Chomsky and Greibach normal Forms.</td>
</tr>
<tr>
<td>Introduction to Nondeterministic Pushdown Automata (NPA).</td>
</tr>
<tr>
<td>Equivalence between NPA and Context-free languages.</td>
</tr>
<tr>
<td>Introduction to Turing machines. Decidable Languages and Computable</td>
</tr>
<tr>
<td>Functions. Church Thesis.</td>
</tr>
<tr>
<td>Nondeterministic Turing Machines. Universal Turing Machines.</td>
</tr>
<tr>
<td>Undecidability: The Halting Problem.</td>
</tr>
<tr>
<td>Introduction to Computational Complexity. The O-Notation.</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES
Knowledge

After completing this module, students will be:
1. Demonstrate the elements of Automata Theory (Finite State, Pushdown and Turing machines).
2. Characterize the limitation of each automata type. Relate the theory of grammars to automata theory.
Skills
After completing this course students will be able to:
1. Design different language definers (automata, grammars, regular expressions), as well as transform one into another.
2. Evaluate the validity of a given statement in automata theory and prove or disprove them.
3. Differentiate between regular, context-free, decidable and undecidable languages.

Teaching/Learning Strategies
- Presentations
- Review and discussion sessions
- Writing Reports.
- Laboratories
- Individual/Group Project

Learning Materials
Useful Websites
- theory.lcs.mit.edu/
Reference Text:

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

Assessment Pattern
- Class Participation 10%
- Assignments 10%
- Tests and Quizzes 10%
- Projects and Reports 10%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

Total 100%

Learning Unit Contact Hours
- Lectures 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:
CS Staff
AIMS
This module is designed to introduce students to analytical tools and methods, which are currently used in digital image processing as, applied to image information for human viewing. Then apply these tools in the laboratory in image restoration, enhancement and compression.

SYLLABUS

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

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. Understand techniques for image compression, analysis and segmentation.
2. Implement hands-on projects involving the processing of image data

Teaching/Learning Strategies
- Lectures
- Tutorials
- Laboratories
- Individual/Group Project
Learning Materials

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

Reference Text:

Supplementary Readings:
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Computers

Assessment Scheme
- Weekly Written Assignments (12 Assignments).
- Class Written Tests (2.5-hr Tests)
- Individual/Team Course Project
- 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 15%
- Projects and Reports 10%
- Mid-Term Exam 20%
- 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 : CSE 464
Title : Artificial Intelligence
Level : 4
Credit Hours : 3
Prerequisites : CSE 454

AIMS
This module introduces students to the basic knowledge representation, problem solving, and learning methods of artificial intelligence. Upon completion of this module, students should be able to develop intelligent systems by assembling solutions to concrete computational problems, understand the role of knowledge representation, problem solving and learning in intelligent-system engineering, as well as in understanding human intelligence from a computational perspective.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to artificial intelligence and AI programming languages</td>
</tr>
<tr>
<td>Intelligent agents</td>
</tr>
<tr>
<td>Problem Solving and State space representation</td>
</tr>
<tr>
<td>Uninformed search techniques</td>
</tr>
<tr>
<td>Informed search techniques</td>
</tr>
<tr>
<td>Game playing</td>
</tr>
<tr>
<td>Propositional and predicate</td>
</tr>
<tr>
<td>Introduction to Learning</td>
</tr>
<tr>
<td>Introduction to Natural Language Processing</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Assess the applicability, strengths, and weaknesses of the basic knowledge representation, problem solving, and learning methods in solving particular engineering problems.
2. Illustrate the fundamental concepts of search techniques and the difference between algorithmic solutions and heuristics.
3. Discuss the importance of learning for intelligent systems.

Skills
After completing this course students will be able to:
1. Derive abstract representations and formulate appropriate solutions for problems (4)
2. Deploy logical, analytical, and problem solving skills and to synthesize solutions (5)
3. Implement some search and game playing algorithms. (6)
4. Build and query a knowledge base and develop simple AI applications.
### Teaching/Learning Strategies
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

### Learning Materials
#### Reference Text:

#### Supplementary Readings:

#### Software Requirements
- Prolog, Lisp or Java IDE.

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

#### Assessment Pattern
- Class Participation 5%
- Assignments 5%
- Tests and Quizzes 10%
- Projects and Reports 20%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

| Total | 100% |

### Learning Unit Contact Hours
- Lectures 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:
CS Staff
Module Code : ECE 465
Title : Information Theory & Coding
Level : 4
Credit Hours : 3
Pre or Co-requisites : ECE 365

AIMS
This module is designed to enable students to focus on the analysis of the source coding, optimal codes, entropy, information channels, using an unreliable channel, error correcting codes, linear codes, and convolution codes.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Coding</td>
</tr>
<tr>
<td>Optimal Codes</td>
</tr>
<tr>
<td>Entropy</td>
</tr>
<tr>
<td>Information Channels</td>
</tr>
<tr>
<td>Using an Unreliable Channel</td>
</tr>
<tr>
<td>Error Correcting Codes</td>
</tr>
<tr>
<td>Linear Codes – Block Coding – Convolutional Coding – Turbo Codes</td>
</tr>
</tbody>
</table>

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:

Supplementary Readings:
- IEEE Information Theory 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%

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
</tr>
</thead>
</table>

### 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
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signals and Systems, and Representation of Signals in Time Domain</td>
</tr>
<tr>
<td>Linear, Time-Invariant Systems, Impulse Response and Convolution Sum</td>
</tr>
<tr>
<td>Linear Constant-Coefficient Difference Equation, Fourier Transform and Frequency Response</td>
</tr>
<tr>
<td>Z-Transform and Inverse Z- Transform and its properties</td>
</tr>
<tr>
<td>More about Properties of z-transform and inverse z-transform</td>
</tr>
<tr>
<td>Discrete Fourier Transform (DFT)</td>
</tr>
<tr>
<td>Signal Analysis and Synthesis based on DFT</td>
</tr>
<tr>
<td>Fundamental Structures of Digital Filters</td>
</tr>
<tr>
<td>Internal Representation of LTIS systems</td>
</tr>
<tr>
<td>Digital Filter Design</td>
</tr>
</tbody>
</table>

EARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Know the mathematical tools used with digital signals.
2. Extract information from digital signals.

Skills
After completing this course students will 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.
- Tutorials.
- Laboratories.
- Team Projects / Term Paper.
# Learning Materials

**Software**
- MATLAB

**Useful Websites**
- [http://www.web-ee.com](http://www.web-ee.com)

**Reference Text:**

**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
500’s LEVEL
MODULES
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

<table>
<thead>
<tr>
<th>Topics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Energy Conversion</td>
<td></td>
</tr>
<tr>
<td>Types of Power Stations</td>
<td></td>
</tr>
<tr>
<td>Principle of Magnetic Circuits:</td>
<td></td>
</tr>
<tr>
<td>Single Phase Transformer</td>
<td></td>
</tr>
<tr>
<td>Electromechanical Energy Conversion</td>
<td></td>
</tr>
<tr>
<td>Principles of DC Machines:</td>
<td></td>
</tr>
<tr>
<td>Three Phase Transformer</td>
<td></td>
</tr>
<tr>
<td>Principles of AC Machines</td>
<td></td>
</tr>
<tr>
<td>Distribution of Electric Power</td>
<td></td>
</tr>
<tr>
<td>Environmental Effects of Energy Resources</td>
<td></td>
</tr>
</tbody>
</table>

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 electrical 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:

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
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to wireless communication systems</td>
</tr>
<tr>
<td>Modern wireless communication systems</td>
</tr>
<tr>
<td>Second Generation (2G) Cellular Networks</td>
</tr>
<tr>
<td>Third Generation (3G) Wireless Networks</td>
</tr>
<tr>
<td>The Cellular Concept—System Design Fundamentals</td>
</tr>
<tr>
<td>Frequency Reuse</td>
</tr>
<tr>
<td>Channel Assignments Strategies</td>
</tr>
<tr>
<td>Handoff Strategies</td>
</tr>
<tr>
<td>Interference and system Capacity</td>
</tr>
<tr>
<td>Trunking and Grade of Service</td>
</tr>
<tr>
<td>Improving Coverage and Capacity in Cellular Systems</td>
</tr>
<tr>
<td>Mobile Radio Propagation: Large-Scale Path Loss</td>
</tr>
<tr>
<td>Mobile Radio Propagation: Small-Scale Fading and Multipath</td>
</tr>
<tr>
<td>Wireless Systems and Standards</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge

After completing this course students will be able to:

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

Skills

After completing this course students will 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:

Supplementary Readings:
- T. S. Rappaport, Wireless Communications Principles and Practice, Prentice Hall
- Proakis, John, Digital Communications, 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
Module Code: CSE 5531
Title: Web Design Concepts
Level: 5
Credit Hours: 3
Prerequisites: CSE334

AIMS
This module is designed to enable senior students to develop the design capabilities for effectively structuring information for the World Wide Web; how to use tools to deploy this information; and methods for assessing Web usability. The course is project based with an emphasis on the application of design and usability assessment within the context of student projects.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Web Development.</td>
</tr>
<tr>
<td>Hypertext Basics and Introduction to HTML.</td>
</tr>
<tr>
<td>Intermediate HTML</td>
</tr>
<tr>
<td>Planning a site</td>
</tr>
<tr>
<td>Page Design</td>
</tr>
<tr>
<td>Style and Presentation</td>
</tr>
<tr>
<td>Graphics Design</td>
</tr>
<tr>
<td>Style Sheets and Site Design</td>
</tr>
<tr>
<td>Introduction to XML and DHTML.</td>
</tr>
<tr>
<td>Scripting</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
2. Illustrate Hypertext Basics and HTML.
3. Demonstrate XML Basics and how to use XML to develop web applications.
4. Differentiate between most of the Web design methodologies and techniques.
5. Characterize server side processing and most of its technologies.

Skills
After completing this course students will be able to:
1. Design and develop comprehensive websites.
2. Master web development techniques.
3. Use the most popular tools for web design and development.
4. Integrate java Applets, spreadsheets and other technologies to build powerful websites.
5. Build interactive web applications using one of the Server side processing techniques

Teaching/Learning Strategies
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.
Learning Materials

Required Software
- Html editor (MS Front page or Dream Weaver)
- Image processing tool (Adobe Photoshop)
- Web Server (IIS, Blazix, TomCat or Apache)

Useful Websites
- http://java.sun.com
- http://webdesigns.com
- http://javaboutique.internet.com
- http://java.sun.com/tutorial

Reference Text:

Supplementary Readings:
- Moving to ASP.NET: Web Development with VB .NET, by Steve Harris, Rob MacDonald, A Press, 2002

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

Assessment Pattern
- Class Participation 10%
- Assignments 10%
- Tests and Quizzes 10%
- Projects and Reports 10%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

Total 100%

Learning Unit Contact Hours
- Lectures 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 : CSE 5532
Title : Database Theory
Level : 5
Credit Hours : 3
Prerequisites : CSE462

AIMS
This module expands the principals of database management systems introduced in the prerequisite module to provide more advanced topics that cover a broad range of concepts, modelling, and system implementation techniques. The focus will be on: emerging technologies such as object-oriented database models and system implementation techniques. It also discusses how issues such as database catalogue, query processing, transaction processing, security, are implemented in real systems.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced topics in SQL</td>
</tr>
<tr>
<td>Enhanced Entity Relationship Diagram (EERD)</td>
</tr>
<tr>
<td>Examples of Relational Database Management Systems: Oracle</td>
</tr>
<tr>
<td>Concepts for Object-Oriented Database Systems</td>
</tr>
<tr>
<td>Overview of the Object Model of ODMG and the Object Definition Language (ODL)</td>
</tr>
<tr>
<td>The Object Query Language (OQL)</td>
</tr>
<tr>
<td>Object Relational and Extended Relational Database Systems</td>
</tr>
<tr>
<td>Database System Architecture and the System Catalog</td>
</tr>
<tr>
<td>Query Processing and Optimization</td>
</tr>
<tr>
<td>Transaction Processing Concepts</td>
</tr>
<tr>
<td>Database Security and Authorization</td>
</tr>
<tr>
<td>Emerging Database Technologies and Applications</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
• Critically appreciate the advanced concepts of database management system.
• Appraise the object orient database models.
• Demonstrate the techniques of implementing transaction processing in a database environment.
• Critically analyze the important issues and techniques of database security.

Skills
After completing this course students will be able to:
1. Evaluate the suitability of object oriented data models for a given application.
2. Design and implement object oriented data models and object based database applications.
3. Apply advanced techniques such as query optimization and transaction processing in database
applications.


Teaching/Learning Strategies
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Required Software
Oracle Database 9i Enterprise Edition, Oracle Developer6i

Useful Websites
- http://otn.oracle.com

Reference Text:

Supplementary Readings:
- An Introduction to Database Systems, 8th ed. by C. J. Date, Addison-Wesley, 2009.

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

Assessment Pattern
- Class Participation 10%
- Assignments 10%
- Tests and Quizzes 10%
- Projects and Reports 10%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

Total 100%

Learning Unit Contact Hours
- Lectures 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:
CS Staff
AIMS
This module is designed to enable senior students to understand the speech signal processing problems, and follow the motivation for nearly all commonly-used speech processing methods. The treatment of speech signal processing requires an initial grounding in digital signal processing. This enables students to understand why things appear the way they do in various spectrographic representations, and also allows a proper coverage of basic speech processing algorithms such as linear prediction and cepstral analysis. The actual speech processing algorithms to be covered are not prescribed. Where possible, students should have access to a software environment which allows interactive investigation of the basic algorithms.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal processing tools: Digital filters, Fourier series and transforms, DFT, FFT, Short-Term Fourier Transform (STFT), Filter banks</td>
</tr>
<tr>
<td>Speech acquisition and digitisation</td>
</tr>
<tr>
<td>Speech analysis and parameter extraction : Short-term analysis, frames and windows, Time-domain analysis: energy, zero-crossings, statistic parameters, autocorrelation, Frequency-domain analysis: spectra and spectrograms, Cepstral analysis, Linear prediction analysis, Pitch and formant estimation, Static and dynamic features</td>
</tr>
<tr>
<td>Speech signal synthesis</td>
</tr>
<tr>
<td>Speech coding</td>
</tr>
<tr>
<td>Speech enhancement</td>
</tr>
<tr>
<td>Signal processing tools</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Define the data structure, and illustrate its basics.
2. Recognise the basic concepts of programming, as well as the value of data to complete the program.

Skills
After completing this course students will be able to:
1. Analyse the various advanced structure of the input data.
2. Practice with advanced topics of programming with C++.
Teaching/Learning Strategies

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

Learning Materials

Useful Websites

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

Reference Text:


Supplementary Readings:

- IEEE Computer Magazine.

Assessment Scheme

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

Assessment Pattern

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

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
</tr>
</thead>
</table>

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
Module Code: ECE 5534
Title: Special Topics in Electronics
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 electronics.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of Electronics available today</td>
</tr>
<tr>
<td>Advances in Electronics research.</td>
</tr>
<tr>
<td>Concentration on a specific research topic in Electronics.</td>
</tr>
</tbody>
</table>

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%

<table>
<thead>
<tr>
<th>Total</th>
<th>100 %</th>
</tr>
</thead>
</table>

**Learning 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
MSAUNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

Module Code : CSE 554
Title : Graduation Project (Part I)
Level : 5
Credit Hours : 3
Prerequisites : Min. Credits 138 and Min. Cum. GPA 2

AIMS
This module is designed to enable senior students to perform appropriate research, and apply relevant engineering standards to develop a solution of a problem, or a design of a system. Students may suggest their own projects, or receiving proposals from supervisors or company sponsor.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define the problem.</td>
</tr>
<tr>
<td>Develop a research plan.</td>
</tr>
<tr>
<td>Conduct background research.</td>
</tr>
<tr>
<td>Evaluate different options of problem solutions</td>
</tr>
<tr>
<td>Decide and Justify a specific solution</td>
</tr>
<tr>
<td>Prepare mid-term oral Presentations.</td>
</tr>
<tr>
<td>Submit mid-term written Reports</td>
</tr>
<tr>
<td>Prepare final oral Presentations.</td>
</tr>
<tr>
<td>Submit final written Reports</td>
</tr>
</tbody>
</table>

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.

**Supplementary Reading:**
- Scientific Papers.
- Research Reports
- Engineering Manuals.
- Technical Catalogues.

**Assessment Scheme**
- Weekly contacts with supervisor.
- Mid- Written and Final written reports.
- Mid and Final oral presentations.

**Assessment Pattern**
- Supervisor Evaluation 40%
- Mid Term Evaluation 20%
- Examiners' Staff Evaluation 40%

<table>
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<tr>
<th>Total</th>
<th>100 %</th>
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</table>

**Leaming 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
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

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to CMOS Circuits: CMOS transistor theory - CMOS process - MOS layout- characterization - dynamic logic</td>
</tr>
<tr>
<td>Combinational Circuit Design. Circuit families, low power circuit design, Silicon on Insulator circuit design</td>
</tr>
<tr>
<td>Sequential Circuit Design Sequencing static circuit, circuit design of latch and DFF static sequencing element methodology, Sequency dynamic circuits.</td>
</tr>
</tbody>
</table>

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:

Supplementary Readings:
- IEEE consumer electronics 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%

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
</tr>
</thead>
</table>

### 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
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

<table>
<thead>
<tr>
<th>Topics</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Lab Safety and Health Movement: an Overview.</td>
<td></td>
</tr>
<tr>
<td>Ethical Guidelines in Engineering Work.</td>
<td></td>
</tr>
<tr>
<td>Scope of Engineering Ethics.</td>
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</tr>
<tr>
<td>Case studies in Engineering Ethics.</td>
<td></td>
</tr>
<tr>
<td>Ethical Guidelines in Research.</td>
<td></td>
</tr>
<tr>
<td>Different codes of Ethics: an Overview.</td>
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<tr>
<td>Managing Health and Safety.</td>
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</tr>
<tr>
<td>Industrial Hygiene.</td>
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</tr>
<tr>
<td>Five Steps to Risk Assessment.</td>
<td></td>
</tr>
<tr>
<td>How Most Accidents and Cases of Work-related Ill Health Arise.</td>
<td></td>
</tr>
<tr>
<td>Working in and Moving Around the Workshop.</td>
<td></td>
</tr>
<tr>
<td>Ergonomic Hazards.</td>
<td></td>
</tr>
<tr>
<td>Standards for the Best Certified Work Place Conditions.</td>
<td></td>
</tr>
<tr>
<td>Instant Check Lists.</td>
<td></td>
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</tbody>
</table>

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. Understand 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 relevant ethical codes.
5. Act in such a manner as to enhance the honor, integrity and dignity of the profession.
6. Design 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](http://temp.onlinethics.org/cases/robot/article-1.htm)
- [chemlabs.uoregon.edu/Safety/GeneralInstructions.htm](chemlabs.uoregon.edu/Safety/GeneralInstructions.htm)
- [www.batesville.k12.in.us/physics/phynet/lab%20rules/lab_rules.html](www.batesville.k12.in.us/physics/phynet/lab%20rules/lab_rules.html)

**Reference Text**

**Supplementary Readings**

**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%

<table>
<thead>
<tr>
<th>Total</th>
<th>100%</th>
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</thead>
</table>

**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
AIMS
This module is designed to provide senior students with the necessary knowledge about
Direct sequence Code division multiple access (DS-CDMA), Multicarrier 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, and Wireless Fidelity (Wi-Fi), Radio Frequency Identification (RFID)

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Access and Wi-Fi Signals (CDMA &amp; OFDM)</td>
</tr>
<tr>
<td>Wireless Channel, Spread Spectrum and Random Variable</td>
</tr>
<tr>
<td>Direct Sequence and Spreading Codes</td>
</tr>
<tr>
<td>Synchronous CDMA</td>
</tr>
<tr>
<td>Asynchronous CDMA</td>
</tr>
<tr>
<td>Rake Receiver, Capacity Analysis &amp; Power Control</td>
</tr>
<tr>
<td>Orthogonal Frequency Division Multiplexing (OFDM) Basics</td>
</tr>
<tr>
<td>Multipath Effects on OFDM</td>
</tr>
<tr>
<td>Fading &amp; MC-CDMA</td>
</tr>
<tr>
<td>Channel Estimation</td>
</tr>
<tr>
<td>Intercarrier Interference</td>
</tr>
<tr>
<td>Ultra Wideband (UWB) &amp; Others</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES
Knowledge
After completing this course students will 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 will be able to:
1. Perform analysis of CDMA & OFDM systems
2. Design CDMA & OFDM systems

Teaching/Learning Strategies
- Lectures
- Laboratories
- Tutorials
- Individual/Group Project

Learning Materials
Useful Websites
- http://www.engr.wisc.edu/
Reference Text:

Supplementary Readings:

Assessment Scheme
- Weekly Written Assignments (12 Assignments).
- Class Written Tests (2.5-hr Tests)
- Individual/Team Course Project
- 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 15%
- Projects and Reports 10%
- Mid-Term Exam 20%
- 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
Module Code : CSE 5632
Title : Neural Networks
Level : 5
Credit Hours : 3
Prerequisites : CSE464

AIMS
This module introduces the fundamentals of neural networks theory, the basic neural network architectures and how they can be used to solve practical problems such as image and voice recognition, classification and others. The module also introduces the concepts of supervised and unsupervised learning and other aspects of learning theory. Practical experience with the models will be integrated into the course. A final computer project and an essay on related work will constitute post-course work.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Neural Networks and their History.</td>
</tr>
<tr>
<td>Biological Neurons and Neural Networks. Artificial Neurons.</td>
</tr>
<tr>
<td>Single Layer Perceptrons.</td>
</tr>
<tr>
<td>Multi-Layer Perceptrons, Back-Propagation.</td>
</tr>
<tr>
<td>Under-Fitting and Over-Fitting.</td>
</tr>
<tr>
<td>Overview of More Advanced Topics.</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students well be able to:
1. Illustrate the basic concepts and techniques of neural networks.
2. Contrast Human perception with electronic perception.
3. Compare the different types of Neural Networks.
4. Illustrate the use of Neural Networks for recognition, classification and other tasks..

Skills
After completing this course students well be able to:
1. Use Neural Networks concepts to solve problems. (5)
2. Use Neural Networks tools to design, create, train and test the network. (6)
3. Implement different Neural Networks to perform various tasks in different application domains.
Teaching/Learning Strategies
- Lectures.
- Tutorials.
- Computer Laboratories.
- Class Presentations.

Learning Materials

Required Software
Matlab, Neuro-Solution

Useful Websites
- http://ieee-nns.org/
- http://www.cs.stir.ac.uk/~lss/NNIntro/InvSlides.html

Reference Text:

Supplementary Readings:
- Artificial Neural Networks in Real-life Applications, Juan Ramon Rabunal, Julian Dorrado, 2005.

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

Assessment Pattern
- Class Participation 10%
- Assignments 10%
- Tests and Quizzes 10%
- Projects and Reports 10%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

Total 100%

Learning Unit Contact Hours
- Lectures 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:
CS Staff
AIMS
This module provides the detailed theories, principles and practices of the design of
compilers. Internals of the process of compilation together with the detailed structure
and components of compilers are studied, to transform a programming language
syntax-specification to a design of a compiler. The essential parts of a compiler (or
interpreter), for a current programming language, are implemented in lab.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lexical Analyzer.</td>
</tr>
<tr>
<td>Context-Free Grammars.</td>
</tr>
<tr>
<td>Top-Down Parsing.</td>
</tr>
<tr>
<td>Bottom-Up Parsing.</td>
</tr>
<tr>
<td>Semantic Analysis.</td>
</tr>
<tr>
<td>Runtime Environments.</td>
</tr>
<tr>
<td>Code Generation.</td>
</tr>
<tr>
<td>Lexical Analyzer.</td>
</tr>
<tr>
<td>Context-Free Grammars.</td>
</tr>
<tr>
<td>Top-Down Parsing.</td>
</tr>
</tbody>
</table>

LEARNING OUTCOMES

Knowledge
After completing this course students will be able to:
1. Demonstrate the internals of the process of compilation.
2. Explain in detail the structure and components of compilers and
implementation of compiler functions.
3. Demonstrate and professionally apply techniques of code generation.
4. Critically appraise the operation and performance of a compiler.

Skills
After completing this course students will be able to:
1. Professionally apply the process of transforming a programming language
syntax-specification to a design of a compiler.
2. Implement the main compiler or interpreter functions such as parsing,
lexical analysis, code generation and optimization.
3. Implement algorithms for optimizing code generation and a new
programming language.
4. Critically evaluate the performance of a compiler and improve its design.
Teaching/Learning Strategies

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

Learning Materials

Reference Text:


Supplementary Readings:

- Compiler Design by Reinhard Wilhelm and Dieter Maurer, Addison-Wesley, 1995.

Software Requirements

- Visual C++.

Assessment Scheme

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

Assessment Pattern

- Class Participation 5%
- Assignments 10%
- Tests and Quizzes 15%
- Projects and Reports 10%
- Unseen Mid-Term Exam 20%
- Unseen Final Exam 40%

Total 100%

Learning Unit Contact Hours

- Lectures 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:

CS Staff
Module Code : CSE 5634
Title : Special Topics in Computer Engineering
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 Computer Engineering.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
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<tr>
<td>Review of Computer Engineering available today</td>
</tr>
<tr>
<td>Advances in Computer Engineering research.</td>
</tr>
<tr>
<td>Concentration on a specific research topic in Computer Engineering.</td>
</tr>
</tbody>
</table>

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 Computer Engineering.
2. Ability to pursue further research in Computer Engineering.

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

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%

<table>
<thead>
<tr>
<th>Total</th>
<th>100 %</th>
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</table>

### Learning Unit Contact Hours

<table>
<thead>
<tr>
<th>Component</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessions</td>
<td>3 hrs / semester</td>
</tr>
<tr>
<td>Total class contact hours</td>
<td>42 hrs / semester</td>
</tr>
<tr>
<td>Total other study hours</td>
<td>66 hrs / semester</td>
</tr>
<tr>
<td>Total other study hours</td>
<td>108 hrs / semester</td>
</tr>
</tbody>
</table>

### Module Leader

Staff
Module Code: CSE 5635  
Title: Advanced Artificial Intelligence  
Level: 5  
Credit Hours: 3  
Prerequisites: CSE464

**AIMS**

This module introduces students to the advanced topics of AI. It presents the latest development in the field that includes Knowledge Based Systems, Probabilistic reasoning, Simple and Complex Decisions, Machine Learning, Knowledge Discovery, Natural Language Processing, Pattern Recognition, and Robotics. Upon completion of this module, students should be able to develop intelligent systems that integrate several intelligent inference engines, understand the role of knowledge, reasoning and learning in intelligent-system engineering, as well as in understanding human intelligence from a computational perspective.

**SYLLABUS**

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Based Systems</td>
</tr>
<tr>
<td>Inference Engines in Knowledge Based Systems</td>
</tr>
<tr>
<td>Machine Learning: Empirical Approach</td>
</tr>
<tr>
<td>Machine Learning: Analytical Approach</td>
</tr>
<tr>
<td>Knowledge Discovery</td>
</tr>
<tr>
<td>Data Mining</td>
</tr>
<tr>
<td>Natural Language Processing in communication</td>
</tr>
<tr>
<td>Pattern Recognition</td>
</tr>
<tr>
<td>Voice Recognition</td>
</tr>
<tr>
<td>Robotics</td>
</tr>
</tbody>
</table>

**LEARNING OUTCOMES**

**Knowledge**

*After completing this course students will be able to:*

1. Assess the applicability, strengths, and weaknesses of the knowledge based systems in different domains.

2. Augment knowledge based systems with intelligent learning and explanation capabilities.

3. Illustrate the fundamental concepts of empirical and analytical learning techniques and the difference between the two learning approaches.

4. Demonstrate the importance of data mining, pattern recognition, and natural language processing.

**Skills**

*After completing this course students will be able to:*

1. Design knowledge based systems augmented with explanation and learning capabilities.

2. Develop and evaluate multi strategy learning systems that integrate
different empirical and analytical methods.

3. Implement and analyze some pattern recognition, voice recognition, and data mining algorithms.

4. Build and query an intelligent robotic algorithm.

**Teaching/Learning Strategies**

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

**Learning Materials**

**Reference Text:**


**Supplementary Readings:**


**Software Requirements**

- Prolog, Lisp or Java IDE.

**Assessment Scheme**

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

**Assessment Pattern**

- Class Participation: 5%
- Assignments: 5%
- Tests and Quizzes: 10%
- Projects and Reports: 20%
- Unseen Mid-Term Exam: 20%
- Unseen Final Exam: 40%

**Total 100%**

**Learning Unit Contact Hours**

- Lectures: 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:**

CS Staff
Module Code : CSE 5636  
Title : Advanced Topics in Computer Engineering  
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 Computer Engineering.

SYLLABUS

<table>
<thead>
<tr>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of Computer Engineering available today</td>
</tr>
<tr>
<td>New Trends in Computer Engineering research.</td>
</tr>
<tr>
<td>Concentration on a specific advanced topic in Computer Engineering.</td>
</tr>
</tbody>
</table>

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 Computer Engineering.
2. Ability to pursue further research in Computer Engineering.

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

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**

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course work</td>
<td>40%</td>
</tr>
<tr>
<td>Mid Term Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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</table>

**Leaning Unit Contact Hours**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>Sessions</td>
<td>3 hrs / week</td>
</tr>
<tr>
<td>Total class contact hours</td>
<td>42 hrs / semester</td>
</tr>
<tr>
<td>Total other study hours</td>
<td>66 hrs / semester</td>
</tr>
<tr>
<td>Total other study hours</td>
<td>108 hrs / semester</td>
</tr>
</tbody>
</table>

**Module Leader**

Staff
MSA UNIVERSITY
FACULTY OF ENGINEERING
MODULE OUTLINE

<table>
<thead>
<tr>
<th>Module Code</th>
<th>CSE 564</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Graduation Project (Part II)</td>
</tr>
<tr>
<td>Level</td>
<td>5</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>3</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>CSE 554</td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>Topics</th>
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</thead>
<tbody>
<tr>
<td>Utilize computer software and / or develop own computer programs.</td>
</tr>
<tr>
<td>Choose an appropriate design satisfying the sponsor's requirements.</td>
</tr>
<tr>
<td>Implement / operate the designated model or prototype.</td>
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<tr>
<td>Analyze and Interpret the results.</td>
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<tr>
<td>Present recommendations and forward suggestion for further research.</td>
</tr>
<tr>
<td>Submit a mid – and final – written report.</td>
</tr>
<tr>
<td>Prepare a mid – and final – oral Presentations.</td>
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<tr>
<td>Defend the work done in a committee of external examiners.</td>
</tr>
</tbody>
</table>

**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.
<table>
<thead>
<tr>
<th>Teaching/Learning Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Orientation Sessions.</td>
</tr>
<tr>
<td>• Review and discussion Sessions.</td>
</tr>
<tr>
<td>• Team projects.</td>
</tr>
<tr>
<td>• Presentations.</td>
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<tr>
<td>• Field trips.</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Learning Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Software Requirements</strong></td>
</tr>
<tr>
<td>• Suitable software packages and/or.</td>
</tr>
<tr>
<td>• Building own computer programs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference Text:</th>
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</thead>
<tbody>
<tr>
<td>• Suitable textbooks and scientific journals in the field of the project.</td>
</tr>
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<table>
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<tr>
<th>Supplementary Reading:</th>
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<td>• Scientific Papers.</td>
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</table>

<table>
<thead>
<tr>
<th>Assessment Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Weekly contacts with supervisor.</td>
</tr>
<tr>
<td>• Mid- Written and Final written reports.</td>
</tr>
<tr>
<td>• Mid and Final oral presentations.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Pattern</th>
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</thead>
<tbody>
<tr>
<td>• Supervisor's Evaluation   40 %</td>
</tr>
<tr>
<td>• Mid Term Evaluation       20 %</td>
</tr>
<tr>
<td>• Examiners' Staff Evaluation 40 %</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Leaning Unit Contact Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Sessions                  3 hrs / week</td>
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<tr>
<td>• Total class contact hours 42 hrs / semester</td>
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<tr>
<td>• Total other study hours   66 hrs / semester</td>
</tr>
<tr>
<td>• Total other study hours   108 hrs / semester</td>
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</table>

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<tr>
<td>Staff</td>
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