# Computer Engineering Courses - CC

## CC 111 - Introduction to Computers

### COURSE INFORMATION

Course Title: Introduction to Computers

Code: CC111.

Hours: Lecture -2 Hrs. Tutorial/Laboratory - 2 Hrs. Credit - 3.

Prerequisite: None.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

This course provides an introduction to computers and computing .Topics of interest include the impact of computers on society, ethical issues, and hardware /software applications, including internet applications, system unit, storage and input/output devices, numbering systems, system and application software, presentation skills, program development, programming languages, and flow charts, Visual Basic, web page design using HTML, and communications and networks.

### TEXT BOOKS

Charles S. Parker, Deborah Morley, "Understanding Computers Today and Tomorrow", Course Technology 2015 Fifteenth Custom edition.

### REFERENCE BOOKS

- Peter Norton, "Introduction to computers", McGraw Hill, latest edition.
- Robert J. Spear and Timothy M. Spear, "Introduction to computer programming in Visual basic", Thomson Learning, latest edition.

### COURSE AIM

- The students must have a general understanding of what computers are and how they operate.
- The students must have good skills in using windows, MS PowerPoint and Visual Basic.
- The students must learn problem solving techniques and program development.
- The student should know the available programming languages and their capabilities.

## COURSE OBJECTIVES

At the end of the course the student should be able to:

- Identify computer hardware components and their specifications and types.
- Use Windows, MS PowerPoint and Visual Basic.
- Understand and use numbering systems.

## COURSE OUTLINE

Week Number 1: Introduction to the World of Computers Input and Output.

Week Number 2: The System Unit: Processing and Memory.

Week Number 3: Storage Devices.

Week Number 4: System Software and Application Software.

Week Number 5: Quiz 1 + Program Development, Programming Languages, and Flow charts.

Week Number 6: Input/ Output Devices.

Week Number 7: 7th Week Exam.

Week Number 8: Visual Basic 1.

Week Number 9: Visual Basic 2.

Week Number 10: Quiz 2 + Visual Basic 3.

Week Number 11: Computer Networks.

Week Number 12: 12th Week Exam.

Week Number 13: Internet and the World Wide Web.

Week Number 14: Ethics, Computer Crime, Privacy, and other Social Issues.

Week Number 15: Revision.

Week Number 16: Final Exam.

## CC 112 - Structured Programming

### COURSE INFORMATION

Course Title: Structured Programming

Code: CC112.

Hours: Lecture -2 Hrs. Tutorial/Laboratory - 2 Hrs. Credit - 3.

Prerequisite: CC111.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

An introduction to C-language Programming is provided in this course, Variable/Constant definitions, Basic Programmes, Sequential Programming, Conditional Programming, Looping and repetitions, Functions, Arrays.

### TEXT BOOKS

Paul Deitel, Harvey Deitel, "C How to Program", Pearson, latest edition

### REFERENCE BOOKS

J.Hanly and E. Koffman, "C Program Design for Engineers", Addison Wesley, latest edition

### COURSE AIM

Introducing Structured programming techniques associated with the C-Language, used to program most nowadays systems. Studying their application to practical problems with special emphasis on some practical applications concerning different disciplines.

### COURSE OBJECTIVES

Studying C-language programming techniques, sequence, selection and repetition control structures, functions, Arrays.

## COURSE OUTLINE

Week Number 1: An introduction to computer and programming.

Week Number 2: Problem solving skills and software development methods.

Week Number 3: Data type operators and simple functions..

Week Number 4: Input/output statements and expressions.

Week Number 5: Selection structures and switch statements.

Week Number 6: Selection structures and switch statements continued.

Week Number 7: Revision + 7$^{th}$ Week Exam.

Week Number 8: Repetition and loop statements.

Week Number 9: Repetition and loop statements continued.

Week Number 10: Functions and modular programming.

Week Number 11: Functions and modular programming continued.

Week Number 12: Revision + 12$^{th}$ Week Exam.

Week Number 13: Arrays applications

Week Number 14: Arrays applications continued

Week Number 15: Multidimensional arrays.

Week Number 16: Final Exam.

## CC 114 - Introduction to Programming*

### COURSE INFORMATION

Course Title: Introduction to programming*

Code: CC 114.

Hours: Lecture - 2 Hrs. Lab/ Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 111 - Introduction to computer.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |
| Practical Examination | 10% |

### COURSE DESCRIPTION

Introduction to Programming and Problem Solving- Variables- Memory Concepts-Assignment Statements-Arithmetic Operations-Logical Operations-Conditional Statements-Selection Control Structures-Multiple-Selection, Statement-Loops-One-Dimensional, Arrays-Two-Dimensional Arrays-Control events in windows applications-Functions and Procedures.

### TEXT BOOKS

- Deitel, P.J; Deitel, H.M; Ayer, D.J, Simply Visual Basic 2010: An Application-Driven Approach, 4th Edition, Pearson International Edition (or Pearson Education).

### REFERENCE BOOKS

David I. Schneider, Introduction to Programming Using Visual Basic 2010, 8/E

### COURSE AIM

This course will help students know the concepts of programming using VB, and knowing how to use editors to implement these concepts.

* Offered only to other departments

## COURSE OBJECTIVES

Upon completion of this course, students should be able to:

- Explain the different concepts of programming, and knowing the different tools that can be used.
- Experiment this using visual studio

## COURSE OUTLINE

Week Number 1: An introduction to Programming and Problem Solving.

Week Number 2: Introducing Variables, Memory Concepts, and Assignment Statements.

Week Number 3: Arithmetic Operations.

Week Number 4: Logical Operations and Conditional Statements.

Week Number 5: Selection Control Structures.

Week Number 6: Multiple-Selection Statement.

Week Number 7: Revision + 7th Week Exam.

Week Number 8: Loops.

Week Number 9: Loops cont.

Week Number 10: One-Dimensional Arrays.

Week Number 11: Two-Dimensional Arrays.

Week Number 12: Revision + 12th Week Exam.

Week Number 13: Control events in windows applications.

Week Number 14: Functions and Procedures.

Week Number 15: Revision

## CC 212 -Applied Programming

### COURSE INFORMATION

Course Title: Applied Programming

Code: CC 212.

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 112.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

An advanced C-language Programming is provided in this course: two dimensional arrays, strings, pointers, recursion, structures, bitwise-operators, input-output interfacing ,graphics, mouse interfacing as well as text and binary files are covered in details. Projects are required from students to increase their skills in C programming.

### TEXT BOOK

J.Hanly and E. Koffman, "C Program Design for Engineers", Addison Wesley, latest edition.

### REFERENCE BOOKS

- H.Schildt, "C, the complete reference ", Osborne McGrawHill, latest edition.

### COURSE AIM

Introducing different programming techniques associated with the C-Language, used to program most nowadays systems. Studying their application to practical problems with special emphasis on some practical applications concerning different disciplines.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to: Studying C-language programming techniques, files, pointers, structure, string, and array, implement GUI, use the mouse in different applications and interface using C .

**COURSE OUTLINE**

| | |
|---|---|
| Week Number 1: | Revision of structured programming constructs: selection, repetition, and Functions. |
| Week Number 2: | Revision of one dimensional array, 2-D arrays. |
| Week Number 3: | Functions by value/reference. |
| Week Number 4: | Search/Sort Techniques. |
| Week Number 5: | Measuring Big O of different algorithms. |
| Week Number 6: | Recursion. |
| Week Number 7: | 7th week exam. |
| Week Number 8: | Strings. |
| Week Number 9: | Structures. |
| Week Number 10: | Text / Binary Files. |
| Week Number 11: | I/O Interfacing, graphics,. |
| Week Number 12: | $12^{th}$ week exam |
| Week Number 13: | Mouse interfacing. |
| Week Number 14: | Pointers |
| Week Number 15: | Projects Presentations |
| Week Number 16: | Final Exam. |

## CC 213 - Programming Applications*

### COURSE INFORMATION

Course Title: Programming Applications.

Code: CC 213.

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 112.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

An advanced C-language Programming is provided in this course: two dimensional arrays, strings, structures, bitwise-operators as well as text and binary files are covered in details.

### TEXT BOOK

Tony Gaddis, "Starting out with C++", Pearson, latest edition.

### REFERENCE BOOKS

- H.Schildt, "C, the complete reference ", Osborne McGrawHill, latest edition.
- J.Hanly and E. Koffman, "C Program Design for Engineers", Addison Wesley, latest edition.

### COURSE AIM

Introducing different programming techniques associated with the C-Language, used to program most nowadays systems. Studying their application to practical problems with special emphasis on some practical applications concerning different disciplines.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to: Studying C-language programming techniques, files, structure, string, and array.

* Offered only to other departments

**COURSE OUTLINE**

Week Number 1: Revision of structured programming constructs: selection

Week Number 2: Revision of repetition

Week Number 3: Revision of one dimensional array.

Week Number 4: Revision of Functions by value.

Week Number 5: Two dimensional arrays.

Week Number 6: Functions by reference.

Week Number 7: 7th week exam.

Week Number 8: Searching and sorting.

Week Number 9: Strings.

Week Number 10: Structures.

Week Number 11: Structures

Week Number 12: 12th week exam.

Week Number 13: Text Files.

Week Number 14: Binary Files.

Week Number 15: Advanced Applications /Revision.

Week Number 16: Final Exam

## CC 215 - Data Structures

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Data Structures | | |
| Code: | CC 215 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial - 2 Hrs. | Credit - 3. |
| Prerequisite: | CC 212. | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Difference between static data type and dynamic data types - the concept of pointers & dynamic memory allocation - programming practice using dynamic structures.

### TEXT BOOK

Mark Weiss and Mark Allen, "Data structures and algorithm analysis in C++", Benjamin Pearson Education, latest edition.

### REFERENCE BOOKS

Donald Knuth, "The art of computer programming", Addison Wesley, latest edition.

### COURSE AIM

Review of data types and static data structures pointers, dynamic data structures: stack queues linked lists, trees and graphs.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Demonstrate the difference between static data type and dynamic data types.
- Introduce the concept of pointers & dynamic memory allocation.
- Give students practical programming experiences using dynamic structures.

## COURSE OUTLINE

| | |
|---|---|
| Week Number 1: | Introduction to static Vs dynamic data structures. |
| Week Number 2: | Introduction to linked list. |
| Week Number 3: | Application of linked list. |
| Week Number 4: | Double and Circular linked lists. |
| Week Number 5: | Stack. |
| Week Number 6: | Stack Applications. |
| Week Number 7: | 7th week exam. |
| Week Number 8: | Queue. |
| Week Number 9: | Introduction to tree structures. |
| Week Number 10: | Tree traversals and Applications. |
| Week Number 11: | Graph Representations. |
| Week Number 12: | 12th week exam. |
| Week Number 13: | Graphs Algorithms. |
| Week Number 14: | Hash Representation. |
| Week Number 15: | Revision. |
| Week Number 16: | Final Exam. |

## CC 216 - Digital Logic Design

### COURSE INFORMATION

Course Title: Digital Logic Design

Code: CC 216

Hours: Lecture - 2 Hrs. Tutorial/Lab - 2/2 Hrs. Credit - 3.

Prerequisite: CC 111.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

The course introduce the concepts of number systems - binary arithmetic and codes - logic gates - Boolean algebra and logic simplifications - Design and realization of combinational circuits - Functions of combinational circuits logic- Sequential Logic ( Flip-Flops, latches, synchronous /Asynchronous counter designs) . Finally, design analysis and realization of counters and shift registers are covered.

### TEXT BOOK

Thomas L. Floyd, "Digital Fundamentals", Prentice Hall, Eleventh edition.

### REFERENCE BOOKS

- M. Mano, "Digital Design", Prentice Hall, latest edition.
- J. P. Hayes, "Introduction to Digital Logic Design", Addison Wesley, latest edition.
- David M. Buchla, "Experiments in Digital Fundamentals", Prentice Hall, latest edition.
- Texas Instruments Data Sheets, latest version.

### COURSE AIM

To develop engineering skills in the design and analysis of digital logic circuits with applications to digital computer.

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Knowing the basic differences between analog and digital systems
- Use binary numbers and codes
- Describe the operation of logic gates
- Applying Boolean algebra on K-map
- Design a combinational and sequential logic circuits to simplify function
- Design synchronous and asynchronous counters
- Design sequential logic circuits and shift Registers

## COURSE OUTLINE

Week Number 1: Introduction to digital concepts.

Week Number 2: Number systems, operations, and codes.

Week Number 3: Logic gates.

Week Number 4: Boolean algebra and logic simplification.

Week Number 5: Simplification using Karnaugh maps, (SOP) and (POS) Expressions.

Week Number 6: Universal gates (NAND, NOR), Quine-McCluskey simplification

Week Number 7: 7th week exam.

Week Number 8: Functions of combinational logic, adders and sub-tractor design

Week Number 9: Decoders, encoders and combinational design.

Week Number 10: MUX, DEMUX and Comparator design.

Week Number 11: Flip-Flops and related devices.

Week Number 12: 12th week exam.

Week Number 13: Asynchronous counter design.

Week Number 14: Synchronous counter design.

Week Number 15: Shift registers.

Week Number 16: Final Exam.

## CC 218 - Discrete Mathematics

### COURSE INFORMATION

Course Title: Discrete Mathematics

Code: CC 218

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 111.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

The logic of statements - logical form and equivalence - logic implementation - arguments - predicates - number theory - counting methods - functions - relations - methods of proof.

### TEXT BOOK

Sussana Epp, "Discrete Mathematics with Applications", Cengage Learning, Latest edition.

### REFERENCE BOOKS

- Dr Rod Haggarty, "Discrete mathematics for computing", Addison Wesley, latest edition.
- Keneth Rosen, "Discrete Mathematic and Application", McGraw Hill , latest edition.

### COURSE AIM

Logic of statements, logical form and equivalence, logic implementation, arguments, predicates, number theory, counting methods, function, relation, methods of proof.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Comprehend mathematical logic, predicates and methods of proof.
- Use mathematical induction to prove the theorems. Understand discrete structures like functions and relations.

- Use methods of counting and probability to solve simple problems.

**COURSE OUTLINE**

Week Number 1: Logical form & logical equivalence.

Week Number 2: Conditional statement, valid & invalid arguments.

Week Number 3: Predicates & quantified statements.

Week Number 4: Arguments with quantified statements.

Week Number 5: Number theory and methods of proof.

Week Number 6: Mathematical Induction

Week Number 7: 7th week exam.

Week Number 8: Functions defined on general sets.

Week Number 9: One-to-one, onto, inverse function, composition of functions.

Week Number 10: Relations on sets.

Week Number 11: Reflexivity symmetry, transitivity & equivalence relations.

Week Number 12: 12th week exam.

Week Number 13: Partial order relations and finite state automata.

Week Number 14: Counting Techniques (1).

Week Number 15: Counting Techniques (2).

Week Number 16: Final Exam.

## CC 311 - Computer Architecture

### COURSE INFORMATION

Course Title: Computer Architecture

Code: CC 311

Hours: Lecture - 2 Hrs. Tutorial / lab- 2/2 Hrs. Credit - 3.

Prerequisite: CC 317.

### GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments - (7th Week): 30%

Midterm # 2/Assignments - (12th Week): 20%

Final Exam: 40%

### COURSE DESCRIPTION

Basic Computer Organization - Arithmetic Logic Unit - High Speed Arithmetic - The MIPS Architecture - Performance Evaluation Techniques - The Memory Element - Memory Organization - Computer Input/Output Organization - The Hardwired Control Unit - Microprogramming and typical Computer Architectures - CISC and RISC Paradigms.

### TEXT BOOK

David A. Patterson and John I. Hennessy, "Computer Organization and Design: The Hardware/Software Interface", El Sevier Ltd, latest edition.

### REFERENCE BOOKS

- M. Mano, C. Kime, "Computer Design Fundamentals", Prentice Hall, latest edition.
- Michael Flynn, "Computer Architecture" Jones and Bartlett, latest edition.

### COURSE AIM

To introduce students to the basic concepts of computer architecture and organization through the study of the fundamentals associated with subject matter.

### COURSE OBJECTIVES

- Upon completion of this course the student will be able to:
- Compare between various architectures

- Design MIPS computer architecture from the given instruction set.
- Program the MIPS processor using its own programming language.
- Design the control using micro-programmed control.
- Assess a pipelined architecture.
- Understand the basic concepts of main memory and cache memory mapping.

**COURSE OUTLINE**

Week Number 1: Introduction-overview of computer architecture-lecture grading policy.

Week Number 2: Computer abstraction and technology + term project.

Week Number 3: The role of performance.

Week Number 4: MIPS Assembly Language.

Week Number 5: Instructions for making decisions and procedures calls.

Week Number 6: Addressing modes.

Week Number 7: 7th week exam.

Week Number 8: The processor: Data path and control.

Week Number 9: Single-Cycle Data path.

Week Number 10: Multi-Cycle Data Path.

Week Number 11: Exceptions.

Week Number 12: 12th week exam.

Week Number 13: Pipelining.

Week Number 14: Hazards and Dependencies in pipelining.

Week Number 15: Cache memory and Virtual memory.

Week Number 16: Final Exam.

## CC 312 - Computer Organization*

### COURSE INFORMATION

Course Title: Computer Organization*

Code: CC 312

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 216.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Computer interconnection structures - computer components - computer function interconnection structures - bus interconnection. - Internal and external memory - computer memory system overview - semiconductors main memory - cache memory - magnetic tape - optical memory - Input / Output - I/O modules - programmed I/O - interrupt-driven I/O - direct memory Access - Operating system - Operating systems overview – scheduling - memory management - The central processing unit - Computer Arithmetic - characteristics and functions of instruction sets - addressing modes - processor organization - the instruction cycle - instruction pipelining - Control unit Micro-operation - hardware implementation - Control Functions.

### TEXT BOOK

Fundamentals of Computer Organization and Architecture, Abd EL-Barr, Hesham EL Rewini, latest edition

### REFERENCE BOOKS

Computer Organization and Architecture (8th Edition) , William Stallings

### COURSE AIM

Introduce students to the basic knowledge necessary to understand the hardware operation of digital computers and covers the main subjects associated with computer hardware.

* Offered only to other departments

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Presenting the various digital components used in the organization and design of digital computers
- Explaining the detailed steps that a designer must go through in order to design an elementary basic computer.
- Introducing the organization and architecture of the main units of a digital computer.

## COURSE OUTLINE

Week Number 1: Introduction to Computer Systems Organization & Architecture - part 1.

Week Number 2: Introduction to Computer Systems Organization & Architecture - part 2.

Week Number 3: Digital Components.

Week Number 4: Register Transfer Organization & Micro-operation - part 1.

Week Number 5: Register Transfer Organization & Micro-operation - part 2.

Week Number 6: Basic computer Organization and Design - part 1.

Week Number 7: 7th Week Exam

Week Number 8: Basic computer Organization and Design - part 2.

Week Number 9: Central Processing Unit - part 1.

Week Number 10: Central Processing Unit - part 2.

Week Number 11: Memory Organization - part 1.

Week Number 12: 12th week Exam

Week Number 13: Memory Organization - part 2.

Week Number 14: Input-Output Organization - part 1.

Week Number 15: Input-Output Organization - part 2.

Week Number 16: Final Exam.

## CC 316 - Object Oriented Programming

### COURSE INFORMATION

Course Title: Object Oriented Programming

Code: CC 316

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 319.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Object oriented modelling and development - classes - objects - inheritance - GUI interfaces - applets - multithreading.

### TEXT BOOK

Y. Daniel Liang, "Introduction to Java Programming", Pearson Education, latest edition.

### REFERENCE BOOKS

- Herbert Schildt, "Java 2 the complete reference", Mac-Graw Hill, latest edition.
- Deitel & Deitel, "Java How to program", Prentice Hall, latest edition.

### COURSE AIM

Teach the students the Object oriented techniques, Design, Analysis, and programming with Java.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- List & Express OOP concepts * Analyze programs in OO manner.
- Define objects and their interrelationship
- Design & Implements programs in Java OO language

**COURSE OUTLINE**

| | |
|---|---|
| Week Number 1: | Overview of Java Language (the procedural features). |
| Week Number 2: | Object Based programming: Encapsulations. |
| Week Number 3: | Objects oriented relationships (Association/ Aggregation and Composition). |
| Week Number 4: | OOP (Inheritance and interfaces). |
| Week Number 5: | Java API. |
| Week Number 6: | OOP Software development (Class design). |
| Week Number 7: | 7th week exam. |
| Week Number 8: | Getting Started with GUI programming. |
| Week Number 9: | Creating user interfaces. |
| Week Number 10: | Event Handling. |
| Week Number 11: | Exception Handling. |
| Week Number 12: | 12th week exam. |
| Week Number 13: | Multithreading. |
| Week Number 14: | I/O streams. |
| Week Number 15: | JDBC and Networking. |
| Week Number 16: | Final Exam. |

## CC 317 - Digital System Design

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Digital System Design | | |
| Code: | CC 317 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial / Lab- 2/2 Hrs. | Credit - 3. |
| Prerequisite: | CC 216. | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Introduction to digital design, combinational digital design and realization using: decoders, encoders, buffer, multiplexers, comparators, adders, and ALU, sequential design and realization using: latches, flip-flops, counters, and shift registers, memories, CPLD, and FPGA. Synchronous analysis and design using algorithmic state machines ASM, Digital design practice, CAD, using FPGA and CPLD.

### TEXT BOOK

Stephen D. Brown, "Fundamentals of Digital Logic with VHDL Design ", McGraw Hill, latest edition.

### REFERENCE BOOKS

F. P. Processor, D. E. Wiskel, "The art of digital Design and introduction to top-Down Design", Prentice hall, latest edition.

### COURSE AIM

To introduce the students to combinational and sequential digital systems design and troubleshooting. The student will be familiar with ASM analysis and design.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Breakdown any digital design problem and work through the standard steps of design and analysis to the implementation stage.

- Utilize the knowledge of combinational design & realization using ICs, Memories and programmable devices.
- Implement synchronous analysis, design and realization using Algorithmic state machine ASM.
- Design on FPGA, CPLD chips using VHDL or Verilog.
- Work with digital design practical applications.

**COURSE OUTLINE**

Week Number 1: Introduction to digital design.

Week Number 2: Quine-McCluskey Simplification Algorithm.

Week Number 3: Algorithmic state machine (ASM) chart.

Week Number 4: Timing Analysis of Digital Designs.

Week Number 5: Physical Layout of PLA, PLD, CPLD, GAL, and FPGA.

Week Number 6: Combinational logic design practices: VHDL.

Week Number 7: 7th Week Exam + Sequential logic design practices.

Week Number 8: Sequential logic design practices.

Week Number 9: Interfacing with FPGA/CPLD boards.

Week Number 10: Interfacing with FPGA/CPLD boards.

Week Number 11: Hierarchical and Modular Design.

Week Number 12: 12th Week Exam + Hierarchical and Modular Design.

Week Number 13: Project Ideas.

Week Number 14: Project Discussions.

Week Number 15: Revision.

Week Number 16: Final Exam.

## CC 319 - Advanced Programming

### COURSE INFORMATION

Course Title: Advanced Programming

Code: CC 319

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 215.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

C# language constructs data types - input/ output & control statements - modularity - arrays - strings - files - classes and objects - Inheritance - Polymorphism - Interfaces.

### TEXT BOOK

Deitel et al, "Visual C# 2010 how to program", Prentice Hall, latest edition.

### REFERENCE BOOKS

Michael McMillan, "Data structures algorithms and programming style with C#", Cambridge University Press, latest edition.

### COURSE AIM

Develop engineering skills in the design and analysis programming of C# language.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Highlight the main features of object oriented programming and the C# programming language.
- Design and write computer programs for object oriented systems.
- Develop software skills in the design and analysis of C# programming

**COURSE OUTLINE**

Week Number 1: An introduction to C# programming language.

Week Number 2: Input / output statement expressions.

Week Number 3: Windows application design.

Week Number 4: Conditional statement and iteration statements.

Week Number 5: Object and classes.

Week Number 6: Methods and modular programming.

Week Number 7: 7th week exam.

Week Number 8: Arrays.

Week Number 9: Strings object and string methods (Part 1).

Week Number 10: Strings object and string methods (Part 2).

Week Number 11: Classes and objects (OOP).

Week Number 12: 12th week exam.

Week Number 13: Inheritance (1).

Week Number 14: Polymorphism.

Week Number 15: Abstract classes and Interfaces.

Week Number 16: Final Exam.

## CC 331 - Data and Computer Communications

### COURSE INFORMATION

Course Title: Data and Computer Communications

Code: CC 331

Hours: Lecture - 2 Hrs. Tutorial / lab - 2/2 Hrs. Credit - 3.

Prerequisite: EC 320.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

The goal of the course is to provide a background and context for the concept of computer networks. The broad range of topics that are encompassed in the field of data and computer communications is introduced, and the fundamental concepts of protocols and protocol architectures are examined. Also the course deals with the fundamental concepts of signal, medium, and encoding. Also deals with other aspects of data communications: reliability and efficiency. Error detection and correction in case of errors during transmission will be covered. A variety of multiplexing techniques can be used to provide for efficient use of the medium. Transmission media is discussed including guided and unguided wireless media. Signal encoding techniques are discussed. Data link control protocols are studied.

### TEXT BOOK

William Stallings,"Data and Computer Communications", Prentice Hall, latest edition.

### REFERENCE BOOKS

Douglas E. Comer, " Computer Networks and Internets", Prentice Hall, latest edition.

Andrew S. Tannenbaum, " Computer Networks", 4th Ed, Prentice Hall, latest edition.

Keiser, G., "LAN", McGraw Hill, latest edition.

## COURSE OBJECTIVES

The goal of the course is to provide a background and context for the concept of computer networks. The broad range of topics that are encompassed in the field of data and computer communications is introduced, and the fundamental concepts of protocols and protocol architectures are examined. Also the course deals with the fundamental concepts of signal, medium, and encoding. Also deals with other aspects of data communications: reliability and efficiency. Error detection and correction in case of errors during transmission will be covered. A variety of multiplexing techniques can be used to provide for efficient use of the medium. Transmission media is discussed including guided and unguided wireless media. Signal encoding techniques are discussed. Data link control protocols are studied.

## COURSE OUTLINE

Week Number 1: Introduction to data Communication and Networking Concepts.

Week Number 2: Protocol Architecture.

Week Number 3: Data Transmission.

Week Number 4: Transmission Media Guided and Wireless

Week Number 5: Signal Encoding Techniques.

Week Number 6: Digital Data Communication Techniques.

Week Number 7: 7th Week Exam.

Week Number 8: Error Detection and Correction Techniques.

Week Number 9: Multiplexing Techniques (TDM, FDM SDM).

Week Number 10: Spread Spectrum (FHSS, DSSS and CDMA).

Week Number 11: Data Link Layer DLL Protocols

Week Number 12: 12th Week Exam.

Week Number 13: Data Link Layer HDLC Protocols

Week Number 14: Local Area Networks.

Week Number 15: Wide Area Networks - Circuit Switching and Packet Switching.

Week Number 16: Final Exam.

# CC 341 - Digital Electronics

## COURSE INFORMATION

Course Title: Digital Electronics

Code: CC 341

Hours: Lecture - 2 Hrs. Tutorial/Lab - 2/2 Hrs. Credit - 3.

Prerequisite: EC 238

## GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

## COURSE DESCRIPTION

Overview of electric and electronic circuit analysis. Linear wave shaping with simple low pass and high pass filters. Non-linear wave shaping with diodes and transistor switching. Analysis and design of basic logic gates with bi-junction and MOS technologies. Analysis and design of astable, monostable and bistable mutivibrators. Logic families performance characteristics.

## TEXT BOOK

Rao et al "Pulse and digital circuits", Pearson India, latest edition.

## REFERENCE BOOKS

Nerl H. E. Weste "Principles of CMOS VLSI Design, A Systems Perspective", Addison Wesley, latest edition.

## COURSE AIM

Introduce students to the different types of diode and transistor switching circuits as well as the different types of integrated circuit logic gates and multi-vibrators, their characteristics, performance and design.

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Understand and design diode and transistor switching circuits.

- Understand the different integrated circuit logic gates (DTL, HTL, RTL, TTL, ECL, MOS, I2L, CMOS). Discuss the characteristics and performance of each of the above types of IC logic gates.

- Design of logic gate circuits as well as circuits to interface between different types of IC logic gates.

**COURSE OUTLINE**

Week Number 1: Pulse Fundamentals.

Week Number 2: Linear Wave-shaping: Low-Pass Filter Circuits.

Week Number 3: Linear Wave-shaping: High-Pass Filter Circuits.

Week Number 4: Non-Linear Wave-shaping : Diode Switching.

Week Number 5: Non-Linear Wave-shaping : Transistor Switching .

Week Number 6: Basic Logic Gates (DL, RTL and DTL)

Week Number 7: 7th Week Exam.

Week Number 8: Bistable Multivibrator Circuits Design and Analysis.

Week Number 9: Monostable Multivibrator Circuits Design and Analysis.

Week Number 10: Astable Multivibrator Circuits Design and Analysis

Week Number 11: TTL logic gates: Analysis and Design

Week Number 12: 12th Week Exam

Week Number 13: MOS logic gates: Analysis and Design

Week Number 14: Gates Performance Characteristics.

Week Number 15: Interfacing of different logic gates.

Week Number 16: Final Exam.

## CC 410 - Systems Programming

### COURSE INFORMATION

Course Title: Systems Programming

Code: CC 410

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 319.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Introduction to system programming - machine architecture - machine language - assembly language - two pass assemblers - one pass assemblers - macro facilities - conditional macros - macro processors - loaders - linkers - introduction to formal languages - compilers and interpreters.

### TEXT BOOK

Puntambekar, Anuradhaa, "System software", Technical Publications, latest edition.

### REFERENCE BOOKS

- John J. Donovan, "Systems Programming", Mc-Graw Hill, latest edition.
- David A. Watt, Deryck Brown "Programming Language Processors in Java: Compilers and Interpreters", Prentice Hall, latest edition.

### COURSE AIM

Study the concepts and the theory behind some system software such as assemblers, loaders, macro processors and linkers. Study the concepts and the theory behind the structure and implementation of high level programming languages processors.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Studying the architecture of a hypothetical machine, its assembly language, macro language.
- Programming in assembly language
- Studying the structure and design of assemblers, linkers and loaders
- Studying the concepts and theory behind the implementation of high level programming languages.

**COURSE OUTLINE**

Week Number 1: System programming Vs. Application programming, Examples for system software, Languages for implementation of system software.

Week Number 2: Machine language, Instruction set, addressing modes.

Week Number 3: Programming in assembly language.

Week Number 4: Structure and design of a two pass assembler - part 1.

Week Number 5: Structure and design of a two pass assembler - part 2.

Week Number 6: Structure and design of one pass assemblers.

Week Number 7: 7th week exam.

Week Number 8: Programming in macro languages.

Week Number 9: Structure and design of macro processors.

Week Number 10: Loaders and linkers (Part 1).

Week Number 11: Loaders and linkers (Part 2).

Week Number 12: 12th week exam.

Week Number 13: Introduction to formal Languages and processing of high level languages (Part 1).

Week Number 14: Introduction to formal Languages and processing of high level languages (Part 2)

Week Number 15: Introduction to formal Languages and processing of high level languages (Part 3)

Week Number 16: Final Exam.

## CC 411 - Introduction to Microprocessors*

### COURSE INFORMATION

Course Title: Introduction to Microprocessors*

Code: CC 411

Hours: Lecture - 2 Hrs. Tutorial:- 2 Hrs. Credit - 3.

Prerequisite: CC 312

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Numbering and coding Systems - Internal Organization of Computers-Reduced Instruction Set computer (RISC) architecture Vs Complex Instruction Set computer (CISC) architecture - Evolution from 8080 to 80486. Pipelining- 8086 Registers- Program Segments- Logical Address- Physical Address- Little Endian Convention- Stack- Flag Register- Addressing Modes- Control transfer Instructions- Data Types and Data Definition-Arithmetic and Logic instructions and Programs- 8088 Microprocessor-8284 and 8288 supporting chips- Local bus Vs System Bus- DMA- Memory Capacity-Memory Organization- ROM(PROM-EPROM-EEPROM -Flash memory-Mask ROM) -RAM (SRAM, DRAM, NV-RAM)- Memory Address Decoding- 8088 I/O Instructions- 8255 PPI Chip

### TEXT BOOK

Muhammad Ali Mazidi and Janice Gillispie Mazidi, "80x86 IBM PC and compatible computers", Prentice Hall, latest edition.

### REFERENCE BOOKS

Barry B. Brey, "Intel Microprocessors", Prentice Hall, latest edition.

* Offered only to other departments

## COURSE AIM

Is to have an in depth knowledge of the architecture and programming of 8-bit and 16-bit Microprocessors and to study how to interface various peripheral devices with them.

## COURSE OBJECTIVES

Is to have an in depth knowledge of the architecture and programming of 8-bit and 16-bit Microprocessors and to study how to interface various peripheral devices with them.

## COURSE OUTLINE

Week Number 1: Introduction to Computing

Week Number 2: Brief History of The 80x86 Family, Pipelining, Introduction to Assembly Programming, and Introduction to Program Segments, Logical address, and Physical address.

Week Number 3: Stack and stack operations, 80x86 Addressing Modes

Week Number 4: Assembly Language Programming.

Week Number 5: Arithmetic Instructions and Programs.

Week Number 6: Logic Instructions and Programs.

Week Number 7: 7th week exam.

Week Number 8: 8088 Microprocessor

Week Number 9: 8284 and 8288 Supporting Chips.

Week Number 10: 8-bit Section of ISA Bus.

Week Number 11: Semi-Conductor Memory Fundamentals

Week Number 12: $12^{th}$ week Exam.

Week Number 13: Memory Address Decoding, IBM PC Memory Map

Week Number 14: 8088 Input/Output Instructions, Programming and Interfacing the 8255

Week Number 15: Project Presentation + Revision

Week Number 16: Final Exam

# CC 412 - Computing Algorithms

## COURSE INFORMATION

Course Title: Computing Algorithms

Code: CC 412

Hours: Lecture - 2 Hrs. Tutorial /lab- 2/2 Hrs. Credit - 3.

Prerequisite: CC 319.

## GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments - (7th Week): 30%

Midterm # 2/Assignments - (12th Week): 20%

Final Exam: 40%

## COURSE DESCRIPTION

Analyze the asymptotic performance of algorithms - demonstrate a familiarity with major algorithms and data structures - synthesize efficient algorithms in common engineering design situations.

## TEXT BOOK

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", MIT Press, latest edition.

## REFERENCE BOOKS

Steven S. Skiena, "The Algorithm Design Manual", Springer-Verlag, latest edition.

## COURSE AIM

Analyze the asymptotic performance of algorithms. Apply important algorithmic design paradigms and methods of analysis to solve problems. Measure the performance of algorithms and Proof correctness of algorithms. Introduction to parallel Algorithms

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Argue correctness of Algorithms
- Analyze worst case running time of algorithms
- Explain the basic properties of randomized algorithms

- Learn how to use the major algorithms, data structures and design paradigms

**COURSE OUTLINE**

Week Number 1: Introduction to the course objectives and policies.

Week Number 2: Analysis of Algorithms, Asymptotic Notations.

Week Number 3: Asymptotic Notations (part 2).

Week Number 4: Divide and Conquer and Quiz #1.

Week Number 5: Sorting: Heapsort, Priority Queues and Linear-time Sorting.

Week Number 6: Greedy Methods.

Week Number 7: 7th week exam.

Week Number 8: Dynamic Programming Part 1.

Week Number 9: Dynamic Programming Part 2.

Week Number 10: Minimum Spanning Trees, Network flow algorithms.

Week Number 11: Graph representation.

Week Number 12: Computational Geometry, closest pair problem.

Week Number 13: Parallel Algorithms Part 1.

Week Number 14: Parallel Algorithms Part 2.

Week Number 15: Projects and Assignments discussion and presentations.

Week Number 16: Final Exam.

## CC 413 - Numerical Analysis*

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Numerical Analysis | | |
| Code: | CC 413 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial - 2 Hrs. | Credit - 3. |
| Prerequisite: | CC 112 - BA323. | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Introduction to numerical methods and their applications - Solving Equations, error analysis, solving system of linear algebraic equations, numerical differentiation & integration, Interpolation.

### TEXT BOOK

Steven C. Chapra and Raymond P. Canale, "Numerical Methods for Engineers with Software and Programming Applications", McGraw Hill, latest edition.

### REFERENCE BOOKS

- Faire Burden, "Numerical Analysis", PWS, latest edition.
- Earl .E. Swartzlander, "Computer Arithmetic", IEEE Computer Society Press.
- Robert .F. Churchhouse, "Numerical methods hand book of applicable mathematics, John Wiley & Sons, latest edition.

### COURSE AIM

Allow students to master the approximation techniques used in numerical solutions that arise in science and engineering problems. Teach students why numerical methods work, what type of errors to expect and when an application might lead to difficulties.

## COURSE OBJECTIVES

- Upon completion of this course the student will be able to: solve equations by different numerical methods, understanding of errors analysis, error propagation, solution of systems of linear equations for direct and indirect methods, numerical integration, numerical interpolation, least square error and regression.

## COURSE OUTLINE

Week Number 1: Introduction to Numerical Analysis and course description

Week Number 2: Solution of equation: Bisection method and Secant method.

Week Number 3: Solution of equation: False Position method.

Week Number 4: Solution of equation: Successive Approximation method.

Week Number 5: Solution of equation: Modified Successive Approximation method.

Week Number 6: Solution of equation: Newton Raphson method and Berge Vieta method.
Week Number 7: 7th week exam

Week Number 8: Error Analysis: Definition of error, Source of errors, Types of errors.

Week Number 9: Error Analysis: Rounding off, Instability, Ill conditioning

Week Number 10: Error Analysis: Error Propagation, Process Graph.
Week Number 11: Solution of system of linear equations: (Direct Methods) Gauss Elimination, Gauss Jordan and LU decomposition.
Week Number 12: 12th week exam.

Week Number 13: Solution of system of linear equations: (Indirect Methods) Jacobi, Gauss Seidel
Week Number 14: Numerical Interpolation: Mid-point, Trapezoidal, Simpson

Week Number 15: Numerical Interpolation: : Linear and Quadratic.

Week Number 16: Final Exam.

## CC 414 - Database systems

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Database systems | | |
| Code: | CC 414 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial /lab - 2/2 Hrs. | Credit - 3. |
| Prerequisite: | CC 319. | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Relational Database analysis - design - normalization and implementation - implementation skills using SQL - Concurrent transactions - XML data management.

### TEXT BOOK

Ramez Elmasry & S. Navathe, "Database Management Systems" Pearson Publishers, latest edition.

### REFERENCE BOOKS

- Peter Rob and Carlos Coronel, "Database Systems: Design, Implementation, and Management", Course Technology, latest edition.
- C. J. Date, "An introduction to database systems", Addison Wesley, latest edition.
- ORACLE developer manuals.
- Ramakrishnan. Gehrke, "Database Management systems", Mc-Graw Hill, latest edition.

### COURSE AIM

Help students to achieve a high level of proficiency at design and implementation of relational database systems for real-world design problems.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Explain database design concepts
- Design a database system for a real-world problem.
- Implement and verify a database system using a Database Management System.
- Write SQL modules to create and query a database application.

**COURSE OUTLINE**

Week Number 1: Introductory to database concepts.

Week Number 2: Relational data model of relational database systems.

Week Number 3: Relational Integrity rules.

Week Number 4: Relational algebra.

Week Number 5: Basic relational analysis and data modeling.

Week Number 6: Normalization of database tables. (Part 1).

Week Number 7: 7th week exam.

Week Number 8: Normalization of database tables. (Part 2).

Week Number 9: Extended relational analysis and data modeling.

Week Number 10: Developing Entity / relationship diagram.

Week Number 11: Developing a database design and Implementation of a real-world problem.

Week Number 12: 12th week exam.

Week Number 13: Transaction management and concurrency control.

Week Number 14: Internal level of database systems

Week Number 15: XML Data management.

Week Number 16: Final Exam.

## CC 415 - Data Acquisition System

### COURSE INFORMATION

Course Title: Data Acquisition Systems

Code: CC 415

Hours: Lecture - 2 Hrs. Tutorial / Lab - 2/2 Hrs. Credit - 3.

Prerequisite: CC 421.

### GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments - (7th Week): 30%

Midterm # 2/Assignments - (12th Week): 20%

Final Exam: 40%

### COURSE DESCRIPTION

Data Acquisition, Definitions & Applications, Data Acquisition channel structure components, Sensors and Transducers: Types, applications, structural classifications, Signal conditioning, Amplifications reshaping, and filtration, Data conversion, principles, devices and limitations, Introduction to data Analysis and elementary control, Case studies, Student Projects.

### TEXT BOOK

Thomas L. Floyd, "Fundamentals of Analog Circuits", Pearson Education, latest edition.

### REFERENCE BOOKS

- Harry N. Norton, "Sensor and Analysis Handbook ", Prentice Hall, latest edition.
- R.Pallas Areny, T. Webster, "Sensors and Signal Conditioning ", John Wiley, latest edition.
- Tran Tien Lang, "Computerized Instrumentation ", John Wiley & Sons., latest edition.
- Brufee Newby, "Electronic Signal Conditioning", Prentice Hall, latest edition.

### COURSE AIM

- To introduce the basic techniques of automatic sensing and measurements in the non-digital world.

- To train students on the principles and to acquire skills in dealing with sensing different physical phenomena. e.g. mechanical, electric, electronic, and optical.

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

Identify Data Acquisition definitions & applications, Data Acquisition Channel structural components. Recognize and use Sensors & Transducers, knowing their types, applications, structural classifications, signal conditioning; Amplifications, reshaping, and filtration. Data conversion; Principles, devices, and limitations. Introduction to data analysis and elementary control. Case studies. Student projects.

## COURSE OUTLINE

Week Number 1: Introduction.

Week Number 2: Data acquisition systems & data acquisition channel.

Week Number 3: Signal conditioning: operational amplifiers & applications.

Week Number 4: Signal conditioning: operational amplifiers circuit analysis and design

Week Number 5: Signal conditioning: analogue signal filters analysis and design

Week Number 6: Special applications of operational amplifiers.

Week Number 7: 7th week exam.

Week Number 8: Review of computer interfacing techniques.

Week Number 9: Sensors, transducers and actuators (part 1).

Week Number 10: Sensors, transducers and actuators (part 2).

Week Number 11: Digital to analogue conversion.

Week Number 12: 12th week exam.

Week Number 13: Analogue to digital conversion techniques.

Week Number 14: Analogue to digital conversion applications and interfacing.

Week Number 15: Practical Projects presentation.

Week Number 16: Final Exam.

## CC 416 - Computer Graphics

### COURSE INFORMATION

Course Title: Computer Graphics

Code: CC 416

Hours: Lecture - 2 Hrs. Tutorial / Lab - 2 / 2 Hrs. Credit - 3.

Prerequisite: CC 319.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week)- Term project(1): | 30% |
| Midterm # 2/Assignments - (12th Week)- Term project(2): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

History and survey of graphics applications - Overview of graphics systems and input-output devices - Drawing Algorithms for points, lines, circles and area filling. Introduction to spline representation and application . Two-dimensional transformation . Windowing and clipping. Interactive input methods - introduction to three-dimensional graphics. Introduction to computer graphics pipeline and graphical processing unit. Programming with Open GL.

### TEXT BOOK

D. Hearn, M.P. Baker and Carithers, "Computer Graphics with Open GL", Prentice Hall, latest edition.

### REFERENCE BOOKS

- Francis S. Hill, "Computer Graphics Open Gl Version", Prentice Hall, latest edition.
- James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughe, "Computer Graphics, Principles and Practices", Addison - Wesley, Latest edition
- Edward Angle, "Interactive Computer Graphics, A Top-Down Approach using Open GL" Pearson Education Inc., Latest edition

### COURSE AIM

The student is provided with the necessary knowledge in mathematics, algorithms design and programming skills to analyse and develop computer graphics applications. This done by

Introducing the student to the basic principles for design, use and understanding of 2-D and 3-D interactive computer graphics. Reviewing the hardware and software components of interactive graphics systems are examined. Development and prototype implementation of computer graphics applications using Open GL an industry standard package e.g Open GL .

## COURSE OBJECTIVES

Upon completion of this course, the student will be able to.

- Understand and follows the development in the field of computer graphics: hardware and software.
- Design and implement a prototype of computer graphics application using a well-recognized industry standard software development package: e.g Open GL.

## COURSE OUTLINE

Week Number 1: Introduction: history and survey of Computer Graphics Applications.

Week Number 2: Overview of Graphics Systems (input and output devices).

Week Number 3: Computer Graphics Pipeline and Open GL.

Week Number 4: Line Drawing Algorithms.

Week Number 5: Circle and Curve Drawing algorithms.

Week Number 6: Two - Dimensional Transformations.

Week Number 7: 7th week exam.

Week Number 8: Three - Dimensional Transformation.

Week Number 9: Viewing Transformation, Line and Polygon clipping algorithm.

Week Number 10: Filling-Area Algorithms.

Week Number 11: Free Curves Drawing: Interpolating Spline techniques.

Week Number 12: 12th week exam.

Week Number 13: Free Curves Drawing: Approximating Spline techniques.

Week Number 14: Introduction to Computer Graphics Pipeline and Graphics Processing Unit (GPU).

Week Number 15: Revision.

Week Number 16: Finals

## CC 417 - Assembly Language

### COURSE INFORMATION

Course Title: Assembly Language

Code: CC 417

Hours: Lecture - 2 Hrs. Tutorial/Lab - 2/2 Hrs. Credit - 3.

Prerequisite: CC 421.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

In this course, students gain knowledge in PC hardware, and in using assembly language, including what needed to write, link and execute a program written in assembly language. The course will also introduce the Intel family of computers, its associated components, and how the operating system controls these components. The formal logic machine,, instruction addressing and execution, computer memory, basics of assembly language, linking and running a program will be addressed. In addition, the course enables students to analyze and implement many practical problems with Assembly language. The course includes a project that teaches students how to deal with various topics in the course.

### TEXT BOOK

Dandamudi, SivaramaP., "Introduction to Assembly Language Programming: For Pentium and RISC", Springer, latest edition

### REFERENCE BOOKS

Karen Miller, Jim Goodman, "An Assembly Language Introduction to Computer Architecture: Using the Intel Pentium", Oxford University Press, latest edition.

Sivarama P. Dandamudi, "Introduction to Assembly Language Programming", Springer, latest edition.

## COURSE AIM

Learning the assembly language instructions set, directives, macros, and data allocation statements. Interact programs with the operating system including memory management and input/output services.

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Given a PC-based system, identify the major components; describe the procedures involved in assembling, linking, debugging, and executing a program.
- Write programs in assembly language to perform the given task (for example: keyboard inputs, mouse clicks, screen outputs, perform arithmetic, sorting) and run them.
- Apply input/output services, conditional processing, arithmetic and string operations.

## COURSE OUTLINE

Week Number 1: Introduction to assembly language and machine language

Week Number 2: Addressing Modes; x86 Architecture: Registers.

Week Number 3: Memory Model; Instruction Set

Week Number 4: Arithmetic skills & project assignment.

Week Number 5: Processor-I/O Interface; Interrupts and DMA

Week Number 6: Stack operations and parameter passing.

Week Number 7: 7th week exam.

Week Number 8: Arrays and string operations

Week Number 9: Dynamic memory allocation and pointers

Week Number 10: High-Level Language Interface

Week Number 11: Subroutines and function calls

Week Number 12: 12th Week Exam.

Week Number 13: Interrupts, bus timing, serial and parallel communications.

Week Number 14: Disk and file handling

Week Number 15: Peripheral device drivers

Week Number 16: Final Exam.

## CC 418 - Operating Systems

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Operating Systems | | |
| Code: | CC 418 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial / Lab - 2 / 2 Hrs. | Credit - 3. |
| Prerequisite: | CC 410. | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Introduction to modern operating systems - the concepts, structure, design principles, implementation issues, and mechanisms of operating systems.

### TEXT BOOK

William Stallings, "Operating Systems: Internals and Design Principles", Prentice Hall, latest edition.

### REFERENCE BOOKS

Harvey M. Deitel, "An introduction to Operating Systems", Addison Wesley, latest edition

Andrew S. Tanenbaum and Albert S. Woodhull, Operating Systems Design and Implementation, 3rd Edition, Prentice Hall

Abraham Silberschatz, Peter Baer Galvin, and Greg Gagne, Operating Systems Concepts, 7th Edition, Wiley, 2005.

Andrew S. Tanenbaum, Modern Operating Systems, 2nd Edition, Prentice Hall, 2001

### COURSE AIM

Introduce concepts of managing modern computer resources which is handled by various OS techniques. It also aims at exposing the student to practical OS features and techniques.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Discuss main OS concepts.
- Solve sample resource management problems
- list important OS algorithms
- Evaluate OS performance, and be exposed to the Linux OS

## COURSE OUTLINE

| | |
|---|---|
| Week Number 1: | Introduction and Computer System Overview. |
| Week Number 2: | Computer System Overview (cont.). |
| Week Number 3: | Operating System Overview. |
| Week Number 4: | Process Description and Control. |
| Week Number 5: | Threads. |
| Week Number 6: | Concurrency: Software Approaches for Mutual Exclusion. |
| Week Number 7: | 7th week exam. |
| Week Number 8: | Concurrency: Other approaches for mutual exclusion (hardware support and OS support (semaphores)). |
| Week Number 9: | Concurrency: Deadlock prevention, avoidance, and detection. |
| Week Number 10: | Memory Management. |
| Week Number 11: | Virtual Memory: Hardware and Control Structures. |
| Week Number 12: | 12th week exam. |
| Week Number 13: | Virtual Memory: OS Software. |
| Week Number 14: | Uniprocessor Scheduling. |
| Week Number 15: | Disk Scheduling and Revision. |
| Week Number 16: | Final Exam. |

## CC 419 - Numerical Methods

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Numerical Methods | | |
| Code: | CC 419 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial / Lab - 2 / 2 Hrs. | Credit - 3. |
| Prerequisite: | CC 112-BA323. | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Introduction to numerical methods and their applications - Solving Equations, error analysis, solving system of linear algebraic equations, Optimization, integration, Interpolation and Least square error and regression.

### TEXT BOOK

Steven C. Chapra and Raymond P. Canale, "Numerical Methods for Engineers", McGraw Hill, latest edition.

### REFERENCE BOOKS

Faire Burden, "Numerical Analysis", 5/ED. PWS, latest edition.
Earl .E. Swartzlander, "Computer Arithmetic-vol 1", IEEE Computer Society Press.
Robert .F. Churchhouse, "Numerical methods hand book of applicable mathematics, John Wiley & Sons, latest edition.

### COURSE AIM

Allow students to master the approximation techniques used in numerical solutions that arise in science and engineering problems. Teach students how numerical methods work, what types and sources of errors to expect and when an application might lead to difficulties, solution of systems of linear equations for direct and indirect methods, Optimization, numerical integration, numerical interpolation, least square error and regression.

## COURSE OBJECTIVES

Upon completion of this course the student will be able to: solve equations by different numerical methods, understanding of errors analysis, error propagation, solution of systems of linear equations for direct and indirect methods, Optimization, numerical integration, numerical interpolation, least square error and regression.

## COURSE OUTLINE

Week Number 1: Introduction to Numerical Analysis and course description.

Week Number 2: Solution of equation: Bisection method and Secant method.

Week Number 3: Solution of equation: False Position method and Newton Raphson method

Week Number 4: Solution of equation: Berge Vieta method.

Week Number 5: Error Analysis: Definition of error, Source of errors, Types of errors.

Week Number 6: Error Analysis: Rounding off, Instability, Ill conditioning

Week Number 7: $7^{th}$ week exam.

Week Number 8: Error Analysis: Error Propagation, Process Graph.

Week Number 9: Solution of system of linear equations: (Direct Methods) Gauss Elimination, Gauss Jordan, and LU Decomposition

Week Number 10: Solution of system of linear equations: (Indirect Methods) Jacobi, Gauss Seidel

Week Number 11: Unconstrained and Constrained Optimization.

Week Number 12: $12^{th}$ week exam.

Week Number 13: Numerical Interpolation: Mid-point, Trapezoidal, Simpson.

Week Number 14: Numerical Interpolation: Linear and Quadratic.

Week Number 15: Least square error and regression

Week Number 16: Final Exam.

## CC 421 - Microprocessors Systems

### COURSE INFORMATION

Course Title: Microprocessors Systems

Code: CC 421

Hours: Lecture - 2 Hrs. Tutorial/ lab: 2/ 2 Hrs. Credit - 3.

Prerequisite: CC311

### GRADING

| | |
|---|---|
| Lab Performance | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Numbering and coding Systems - Internal Organization of Computers-Reduced Instruction Set computer (RISC) architecture Vs Complex Instruction Set computer (CISC) architecture - Evolution from 8080 to 80486. Pipelining- 8086 Registers- Program Segments- Logical Address- Physical Address- Little Endian Convention- Stack- Flag Register- Addressing Modes- Control transfer Instructions- Data Types and Data Definition-Arithmetic and Logic instructions and Programs- 8088 Microprocessor-8284 and 8288 supporting chips- Local bus Vs System Bus- DMA- Memory Capacity-Memory Organization- ROM(PROM-EPROM-EEPROM -Flash memory-Mask ROM) -RAM (SRAM, DRAM, NV-RAM)- Memory Address Decoding- 8088 I/O Instructions- 8255 PPI Chip

### TEXT BOOK

Muhammad Ali Mazidi and Janice Gillispie Mazidi, "80x86 IBM PC and compatible computers", Prentice Hall, latest edition.

### REFERENCE BOOKS

Barry B. Brey, "Intel Microprocessors", Prentice Hall, latest edition.

### COURSE AIM

Is to have an in depth knowledge of the architecture and programming of 8-bit and 16-bit Microprocessors and to study how to interface various peripheral devices with them.

### COURSE OBJECTIVES

See Course Aim.

## COURSE OUTLINE

Week Number 1: Introduction to Computing

Week Number 2: Brief History of The 80x86 Family, Pipelining, Introduction to Assembly Programming, and Introduction to Program Segments, Logical address, and Physical address.

Week Number 3: Stack and stack operations, 80x86 Addressing Modes

Week Number 4: Assembly Language Programming.

Week Number 5: Arithmetic Instructions and Programs.

Week Number 6: Logic Instructions and Programs.

Week Number 7: 7th week exam.

Week Number 8: 8088 Microprocessor

Week Number 9: 8284 and 8288 Supporting Chips.

Week Number 10: 8-bit Section of ISA Bus.

Week Number 11: Semi-Conductor Memory Fundamentals

Week Number 12: Memory Address Decoding, IBM PC Memory Map

Week Number 13: $12^{th}$ week Exam.

Week Number 14: 8088 Input/Output Instructions, Programming and Interfacing the 8255

Week Number 15: Project Presentation + Revision

Week Number 16: Final Exam

## CC 431 - Computer Networks

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Computer Networks | | |
| Code: | CC 431 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial / lab - 2/2 Hrs. | Credit - 3. |
| Prerequisite: | CC 331. | | |

### GRADING

| | |
|---|---|
| Lab Performance | 10% |
| Midterm # 1 / Assignments - (7th Week): | 30% |
| Midterm # 2 / Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Introduction - Computer Networks and the Internet - Networking protocol layers OSI and TCP/IP- Application Layer Principles of net applications, web and HTTP, FTP, electronic mail, DNS and Peer to Peer applications. Transport layer, Multiplexing and demultiplexing, Connectionless Transport and UDP -reliable data transfer and connection oriented transport TCP, congestion control. Network layer forwarding and routing, IP protocol, routing algorithms, Broadcast and Multicast routing. Data Link layer, introduction and services, error detection and correction techniques, Multiple access protocols and Link layer addressing, Ethernet and PPP.

### TEXT BOOK

James Kurose, Keith Ross "Computer Networking - A top-down approach", Prentice Hall, latest edition.

### REFERENCE BOOKS

- Andrew S. Tannenbaum, " Computer Networks", Prentice Hall, latest edition.
- David Etheridge and Errol Simon, "Information Networks", Prentice Hall, latest edition.
- Timothy Ramtke, "Networks", Prentice Hall, latest edition.
- F. Halsall, "Data communication, computer networks and open systems", Addison-Wesley, latest edition.

## COURSE AIM

To provide unified view of the broad field of computer networks. To emphasize networking principles and topics of fundamental importance concerning the different networking layers, following a top down system approach.

## COURSE OBJECTIVES

Upon completion of this course the student will be able to develop network applications and see through the complexity of computer networks and will learn the distinct concepts and protocols in computer networks.

## COURSE OUTLINE

Week Number 1: Computer Networks and the Internet: Defining the Internet, the Network Edge and the Network core.

Week Number 2: Delay, Loss, and Throughput in Packet Switched Networks.- Protocol Layers and Their Service Models-Networks under Attack- Hiistory of Computer Networking and the Internet

Week Number 3: Principles of Network Applications.-The Web and HTTP.

Week Number 4: File Transfer Protocol: FTP -Electronic Mail in the Internet

Week Number 5: DNS: The Internet's Directory Service

Week Number 6: Transport layer introduction and services.Multiplexing and demultiplexing

Week Number 7: 7th week exam

Week Number 8: Connectionless Transport: UDP-Principles of Reliable Data Transfer

Week Number 9: Connection-Oriented Transport: TCP

Week Number 10: Principles of Congestion Control-TCP Congestion Control

Week Number 11: Network Layer Introduction-Virtual Circuits and Datagram Networks

Week Number 12: 12th Week Exam.

Week Number 13: The Internet Protocol: Forwarding and Addressing in the Internet

Week Number 14: Routing Algorithms

Week Number 15: Revision + Presentation of projects

Week Number 16: Final Exam.

## CC 441 - Fundamentals of Microprocessors*

### COURSE INFORMATION

Course Title: Fundamentals of Microprocessors

Code: CC 441

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 216.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Internal Organization of Computers - Basic processor building blocks - ALU, Registers and control unit description- Evolution of Intel x86 processors - 8086/8088 Registers- Program Segments- Logical Address-Physical Address- Little Endian Convention- Stack operations - Flag Register- Addressing Modes- Control transfer Instructions- Data types and Data definition - Arithmetic and Logic instructions and Programs - Local bus Vs System Bus- Memory Capacity - Memory Organization - Memory Address Decoding - DMA - I/O Instructions and interfacing.

### TEXT BOOK

Mazidi, Muhammad Ali, "The x86 PC Assembly Language, Design and interfacing", Prentice-Hall, Inc Latest Edition

### REFERENCE BOOKS

- M. Mano, "Computer System Architecture", Englewood Cliffs, NY: Prentice Hall, latest edition.
- Barry B. Brey, "Intel Microprocessors", Prentice Hall, latest edition.

### COURSE AIM

This course introduces the students to the fundamentals of microprocessor systems, components and interfacing. The basic processor components and control unit design is introduced. The Intel 8086/8088 Microprocessor is used as case study. The programming and interfacing with memory and various peripheral devices are introduced. The students explore the essentials of memory address decoding and bus timing. The I/O interfacing is introduced.

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Introducing the organization of the main units of a digital computer.
- Write simple X86 assembly language programs.
- Properly utilize microprocessor components and peripherals.
- Presenting the various Memory interface components used in the memory organization
- Interface a microprocessor to external input/output devices.

## COURSE OUTLINE

Week Number 1: Basic Computer system Organization and instruction Set

Week Number 2: Basic processor components (ALU, Registers, Control Unit)

Week Number 3: Instruction types, bus timing, control unit concepts.

Week Number 4: Basic Computer design concepts.

Week Number 5: Microprocessor fundamentals and basic operations.

Week Number 6: Microprocessor components, Pipelining.

Week Number 7: 7th week Exam + Logical and Physical address, Addressing Modes.

Week Number 8: Stack and stack operations

Week Number 9: Assembly Language, Arithmetic/Logic Instructions.

Week Number 10: String operations and Input/output Interrupts.

Week Number 11: Brief History of The 80x86 Family and 8086/8088 Microprocessor layout.

Week Number 12: 12th Week Exam + Memory organization.

Week Number 13: Memory Address Decoding, Read/Write cycles and control signals.

Week Number 14: Memory Interface with Intel 8086/8088 microprocessors.

Week Number 15: Input/output Interface with Intel 8086/8088 microprocessors.

Week Number 16: Final Exam.

## CC 442 - Digital Design and Introduction to Microprocessor*

### COURSE INFORMATION

Course Title: Digital Design and Introduction to Microprocessor*

Code: CC 442

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 112- CC114.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

The course serves as an introduction to basic digital operations and digital circuits. Topics included are number systems, logic gates, Boolean algebra, combinational logic, flip flops, registers, memories, and an introduction to microprocessors. . It demonstrates concepts through the design of a variety of logic circuits such as adders, comparators, decoders, encoders, Multiplexers, Demultiplexers, counters, registers, and microprocessors.

### TEXT BOOK

Thomas L. Floyd, "Digital Fundamentals", Prentice Hall, latest edition.

### REFERENCE BOOKS

- M. Mano, "Digital Design", Prentice Hall, latest edition.
- John Crisp, "Introduction to Microprocessors and Microcontrollers", Newnes, latest edition.
- John F. Wakerly, "Digital Design Principles and Practices", Prentice Hall, latest edition.

### COURSE AIM

To develop engineering skills in the design and analysis of digital logic circuits with applications to digital computer and microprocessors.

* Offered only to other departments

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Perform the conversion among different number systems; Familiarity with basic logic gates
- Understanding Boolean algebra and basic properties of Boolean algebra; . Ability to optimize logic expression using Karnaugh maps.
- Design simple combinational logics using basic gates.
- Familiarity with basic sequential logic components, th and able to analyze sequential logic circuits.
- Design combinational and sequential logic circuit.

## COURSE OUTLINE

Week Number 1: Introduction to digital concepts.

Week Number 2: Number system, operation, and codes.

Week Number 3: Logic Gates and Switching Functions.

Week Number 4: Implementation of logic gates using universal gates

Week Number 5: Boolean algebra and Karnaugh map simplification

Week Number 6: Function of combinational logic.

Week Number 7: 7th week exam.

Week Number 8: Adder and Comparator

Week Number 9: Decoders, Encoders, MUX, and DMUX

Week Number 10: Sequential logic design.

Week Number 11: Flip-flops and related devices

Week Number 12: 12th Week Exam.

Week Number 13: Shift register.

Week Number 14: Design of synchronous and asynchronous counter.

Week Number 15: Introduction to microprocessor

Week Number 16: Final Exam.

## CC 509 - Introduction to Embedded Systems *

### COURSE INFORMATION

Course Title: Introduction to Embedded Systems

Code: CC 509

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC411.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

The aim of this course is to provide an introduction to embedded systems, Microcontrollers, and comparison with conventional computing systems. The course covers the embedded systems building blocks, interfacing, memory, I/O modules, and different design issues. It covers the embedded systems programming and operation systems. It also introduces the different implementation, development and testing issues.

### TEXT BOOK

-Embedded systems Architecture, Elsevier Inc. Latest eddition, ISBN: 0-7506-7792-9, Author: T. Noergaard, latest edition

- Embedded System Design, Springer, 2006, Author: P. Marwedel

### REFERENCE BOOKS

-Designing Embedded Hardware, 2005, Author: John Castsoulis, latest Eddtion..
- Computers as Components: Principles of Embedded Computing system Design, latest Edition, Morgan Kaufman Publishers, 2008, Author: W. Wolf,

- ARM System Developers' Guide, Authors: A. N. Sloss, D. Symes, and C. Wright

## COURSE AIM

The aim of this course is to introduce an introduction to embedded systems, with the principles of embedded systems design. Comparison between microcontrollers and embedded microprocessors are introduced. The Interfacing, Memory management, and I/O modules are also mentioned. The student will be able to understand and develop various types of Embedded Systems. The course Covers Embedded Systems design, programming, operating systems, development, implementation and testing.

## COURSE OBJECTIVES

Upon completion of this course, the student will be able to:

- Identify the properties of different embedded systems applications.
- Determine the basic components of embedded systems.
- Examine the different design issues related to embedded systems
- Implement, test and develop the desired embedded system.

## COURSE OUTLINE

Week Number 1: Introduction to Embedded systems and conventional computing systems.

Week Number 2: Microcontroller architectures, Interfacing, Memory, and I/O modules.

Week Number 3: Embedded Systems Models and Architecture.

Week Number 4: Embedded Systems Building Blocks.

Week Number 5: Memory Addressing and Interfacing.

Week Number 6: I/O Types and Interfacing.

Week Number 7: 7th week exam.

Week Number 8: Embedded Systems Programming-1.

Week Number 9: Embedded Systems Programming-2.

Week Number 10: Introduction to Embedded Operating Systems

Week Number 11: Middleware and Application Software

Week Number 12: 12th week exam

Week Number 13: Embedded systems development process.

Week Number 14: Implementation and Testing.

Week Number 15: Term work Projects

Week Number 16: Final Exam

## CC 510 - Embedded Systems Design

### COURSE INFORMATION

Course Title: Embedded Systems Design

Code: CC 510

Hours: Lecture - 2 Hrs. Tutorial/Lab - 2 /2 Hrs. Credit - 3.

Prerequisite: CC 418 - CC421.

### GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments - (7th Week): 30%

Midterm # 2/Assignments - (12th Week): 20%

Final Exam: 40%

### COURSE DESCRIPTION

The course introduces an introduction to embedded systems, covers fundamentals of microcontrollers, Interfacing, Memory, and I/O modules. Develop an understanding of the technologies behind Embedded Systems Design issues, embedded hardware Building Blocks, embedded processors, memory addressing and interfacing. The course Covers Embedded Systems programming, embedded operating systems, design, development, implementation and testing.

### TEXT BOOK

-Embedded systems Architecture, Elsevier Inc. Latest eddition, ISBN: 0-7506-7792-9, Author: T. Noergaard

- Embedded System Design, Springer, 2006, Author: P. Marwedel

### REFERENCE BOOKS

-Designing Embedded Hardware, 2005, Author: John Castsoulis, latest Eddtion..
- Computers as Components: Principles of Embedded Computing system Design, latest Edition, Morgan Kaufman Publishers, 2008, Author: W. Wolf,

- ARM System Developers' Guide, Authors: A. N. Sloss, D. Symes, and C. Wright

### COURSE AIM

The aim of the course is to provide students with a detailed understanding of embedded systems, covers fundamentals of microcontrollers, Interfacing, Memory, and I/O modules. Develop an understanding of the technologies behind Embedded Systems design issues, embedded hardware Building Blocks, embedded processors, memory addressing and interfacing. The course Covers

Embedded Systems programming, embedded operating systems, design, development, implementation and testing.

## COURSE OBJECTIVES

The aim of the course is to provide students with a detailed understanding of embedded systems, covers fundamentals of microcontrollers, Interfacing, Memory, and I/O modules. Develop an understanding of the technologies behind Embedded Systems design issues, embedded hardware Building Blocks, embedded processors, memory addressing and interfacing. The course Covers Embedded Systems programming, embedded operating systems, design, development, implementation and testing.

## COURSE OUTLINE

Week Number 1: Introduction to Embedded systems, Microcontrollers, Embedded processors, and Comparison between Embedded systems and conventional computing systems

Week Number 2: Microcontrollers architecture, Interfacing, Memory, and I/O modules

Week Number 3: Embedded Systems Design issues and embedded hardware Building Blocks

Week Number 4: Embedded Processors

Week Number 5: Memory Addressing and Interfacing.

Week Number 6: I/O Interfacing.

Week Number 7: 7th week exam.

Week Number 8: Embedded Systems Programming

Week Number 9: Continue with Embedded Systems Programming

Week Number 10: Embedded Operating Systems

Week Number 11: Continue with Embedded Operating Systems

Week Number 12: 12th week exam

Week Number 13: Middleware, application software and embedded systems development.

Week Number 14: Implementation and Testing

Week Number 15: Term work Projects

Week Number 16: Final Exam

## CC 511 - Artificial Intelligence

### COURSE INFORMATION

Course Title: Artificial Intelligence

Code: CC 511

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 218 - CC319.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

History and Goals - Representation and search - Knowledge based systems - Logic (Propositional and Predicate) as a representation language - Problem Solving Strategies, Game playing Trees (MinMax, alpha-beta pruning), Iterative improvement search, Generic algorithms, Introduction to Perceptron Neural networks & feed forward networks, First order logic, Propositional logic and Expert systems.

### TEXT BOOK

Stuart Russell and Peter Norvig, "Artificial Intelligence : A modern Approach", Prentice-Hall, latest edition.

### REFERENCE BOOKS

- Elaine Rich, Kevin Knight, "Artificial intelligence", McGrawHillInc, latest edition.
- John Durkin, "Expert systems", Mc-Graw Hill, latest edition.

### COURSE AIM

To explain the basic concepts of artificial intelligence. Discuss a wide variety of search techniques and explain the methods for problem Solving Strategies, Game playing Trees (MinMax, alpha-beta pruning), Iterative improvement search, Generic algorithms, Introduction to Perceptron Neural networks & feed forward networks, First order logic, Propositional logic and Expert systems.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Implement a wide variety of intelligent applications using C, Prolog, and shells

## COURSE OUTLINE

Week Number 1: Introduction to AI : Definition - History - Goals.

Week Number 2: AI as Representation and Search. State Space. Problem solving & Search Strategies.

Week Number 3: Blind search techniques.

Week Number 4: Informed (Heuristic) search techniques : Hill Climbing - Best First.

Week Number 5: A* search. Admissibility - Monotonicity - Informedness of a heuristic function and Evaluation of search strategies and complexity.

Week Number 6: Game trees, game playing approaches.

Week Number 7: 7th week exam.

Week Number 8: Machine Learning, Introduction to artificial neural networks, perceptron networks, feed forward networks, Back-propagation learning rule.

Week Number 9: Introduction to generic algorithms and optimization problems.

Week Number 10: Knowledge representation and Propositional logic.

Week Number 11: First Order Logic:Syntax - Semantic - Resolution - Soundness - Completeness.

Week Number 12: 12th week exam.

Week Number 13: Expert systems and Knowledge-based system.

Week Number 14: Continue with expert systems, forward and backward chaining.

Week Number 15: AI Applications & case studies.

Week Number 16: Final Exam.

## CC 513 - Computing Systems

### COURSE INFORMATION

Course Title: Computing Systems

Code: CC 513

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 418 - CC 421.

### GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments - (7th Week): 30%

Midterm # 2/Assignments - (12th Week): 20%

Final Exam: 40%

### COURSE DESCRIPTION

High performance computing, ILP, RISC architecture, Memory hierarchy, Pipelining, Vector processing, Array processing, Massively parallel processors, Multiprocessor architecture, Data flow computers. Different Parallel computing models, Shared and Distributed Memory Systems, Analyse the use of virtual and cache memory and evaluate their effects on computer systems.

### TEXT BOOK

Michel Dubois, Murali Annavaram, Per Stenstrom " Parallel Computer Organization and Design ", Cambridge University Press, latest edition.

### REFERENCE BOOKS

- John P.Hayes, "Computer Architecture and Organization", McGraw Hill, latest edition.
- K. Hwang, "Advanced Computer Architecture", McGraw Hill, latest edition.
- A.John Anderson, "Multiple processing, A system overview", Prentice Hall, latest edition.
- Edward Ritman, "Exploring Parallel Processing", Windcrest, latest edition.

### COURSE AIM

To introduce concepts of high performance computing advanced computing architectures and multiprocessing requirements. The impact of VLSI on modern computing architectures is emphasized with applications on different architectures.

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Identify different modern computer system architectures.
- Understand the concept of high performance computing
- Recognize various parallel processing concepts
- Distinguish the difference between Shared and distributed memory models
- Clarify the effect of virtual and cache memories on the computer systems

## COURSE OUTLINE

Week Number 1: Introduction to high performance computing.

Week Number 2: Parallel Computer Models.

Week Number 3: Instruction Level Parallelizm.

Week Number 4: Memory Hierarchy.

Week Number 5: Memory and I/O Subsystem.

Week Number 6: Virtual Memory.

Week Number 7: 7th week exam.

Week Number 8: Introduction to Pipeline Design.

Week Number 9: Superscalar / Super pipeline.

Week Number 10: Multiprocessor architecture.

Week Number 11: System Interconnect.

Week Number 12: 12th week exam.

Week Number 13: Vector Processing.

Week Number 14: SIMD Organization.

Week Number 15: New Architecture trends.

Week Number 16: Final Exam.

## CC 515 - Introduction to Software Engineering

### COURSE INFORMATION

Course Title: Introduction to Software Engineering

Code: CC 515

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 319- CC414.

### GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments - (7th Week): 30%

Midterm # 2/Assignments - (12th Week): 20%

Final Exam: 40%

### COURSE DESCRIPTION

Introduction to software engineering disciplines with emphasis on software life cycle - project management - verification - validation and testing of software.

### TEXT BOOK

Ian Sommerville, "Software Engineering", Addison Wesley, latest edition.

### REFERENCE BOOKS

Roger Pressman, "Software Engineer: A practitioner Approach", McGraw - Hill, latest edition.

### COURSE AIM

To expose students to the software life cycle and to understand how to analyze, design, implement and test large-scale software. To practice teamwork in developing software project and to introduce techniques and standard documents used in each stage of the software life cycle.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- The software life cycle model requirement and specifications
- Design models, structured and object oriented design, program development, programming development tools, configuration control
- Program testing and verification, maintenance, Reliability, CASE

## COURSE OUTLINE

Week Number 1: Introduction to Software Engineering.

Week Number 2: Introducing the notion of S/W process.

Week Number 3: The software process models.

Week Number 4: Project Management.

Week Number 5: Software Requirements (Part 1).

Week Number 6: Software Requirements (Part 2).

Week Number 7: UML.

Week Number 8: Project Presentation.

Week Number 9: Architectural Design.

Week Number 10: Object Oriented Design.

Week Number 11: Rapid Application Development.

Week Number 12: Critical Systems Development.

Week Number 13: Topics in Software Engineering: Verification and Validation.

Week Number 14: Topics in Software Engineering: Testing.

Week Number 15: Project Presentation (Final).

Week Number 16: Final Exam.

## CC 516 -Image Processing & Pattern Recognition

### COURSE INFORMATION

Course Title: Pattern Recognition

Code: CC 516

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 416 , BA326.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Smoothing operations - edge detection algorithms - the connected component methodology - shape detection and morphological operations - statistical decision - other paradigms in pattern recognition include hierarchical and partitional clustering - feed-forward and feed-backward neural networks.

### TEXT BOOK

Rafael C. Gonzalez, Richard E. Woods," Digital Image Processing", Prentice Hall, latest edition..

### REFERENCE BOOKS

Earl Gose ,Richard Johnson ,Steve Jost ,"Pattern Recognition and Image Processing", Prentice Hall, latest edition.

### COURSE AIM

Introduces a thorough grounding of the principles of image analysis and pattern recognition and seeks to develop students' knowledge on its techniques. It concentrates on the fundamental theory of image processing with emphasis on the areas of image enhancement, segmentation, and their applications. In addition, on finishing this course, students will be familiar with the most frequently used pattern recognition techniques, such as statistical classifiers, clustering and neural networks..

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Cover a balanced mixture of theory and practice including laboratory sessions and tutorials

- Use of the MATLAB image toolbox and will be able to apply it to real life problems
- Practical area includes blood cell classification and face recognition.

## COURSE OUTLINE

Week Number 1: Introduction to Pattern Recognition.

Week Number 2: Image representation, Image Filtering, and colour schemes

Week Number 3: Edge detection techniques.

Week Number 4: Object representation, chain codes, and Morphological Operations.

Week Number 5: Feature extraction, Scene Segmentation and Labelling.

Week Number 6: Clustering

Week Number 7: 7th week exam.

Week Number 8: Matching techniques.

Week Number 9: Classifier Models, Minimization of Classification Error.

Week Number 10: Statistical Pattern Recognition, Bysian Classifiers

Week Number 11: Machine learning.

Week Number 12: 12th week exam.

Week Number 13: Feed Forward and Back-propagation Neural Networks

Week Number 14: Hierarchical Clustering, Partitional Clustering.

Week Number 15: Application case studies and performance measures.

Week Number 16: Final Exam.

## CC 517 - Modelling and Simulation

### COURSE INFORMATION

Course Title: Modelling and Simulation

Code: CC 517

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 319, BA 326.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Review of Probability, random variables and distributions - random Processes - discrete and continuous markov Processes - queuing systems - stochastic petri nets - computer generation of random numbers - simulation of an M/M/1 queuing system.

### TEXT BOOK

Averill M. Low & W. David Kelton, "Simulation Modeling and Analysis", Mc Graw -Hill, latest edition.

### REFERENCE BOOKS

Barry L. Nelson, "Stochastic Modeling: Analysis and Simulation", Mc Graw - Hill, latest edition.

### COURSE AIM

To understand the models as tools to make predictions about the behavior of systems. Acquiring the necessary conceptual and practical background for representing discrete and continuous random processes.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- To emphasize basic principles of the field of Modelling and Simulation

- Highlight the different stages in building a discrete event simulation model and the architecture of a simulation software

**COURSE OUTLINE**

Week Number 1: Introduction.

Week Number 2: Review of probability, random variables and distributions

Week Number 3: The exponential and Poisson distributions.

Week Number 4: Generation of random numbers and distributions.

Week Number 5: Operational laws. Little law and its applications.

Week Number 6: Random processes, state transition diagrams.

Week Number 7: 7th week exam.

Week Number 8: Discrete and Continuous Markov processes, steady state solutions.

Week Number 9: Continuous Markov processes (continue).

Week Number 10: Queueing models - performance measures.

Week Number 11: Applications.

Week Number 12: 12th week exam.

Week Number 13: Modeling with stochastic Petri nets.

Week Number 14: Modeling with stochastic Petri nets (continue).

Week Number 15: Features of Simulation languages.

Week Number 16: Final Exam.

## CC 518 - Data Security

### COURSE INFORMATION

Course Title: Data Security

Code: CC 518

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 319.

### GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments - (7th Week): 30%

Midterm # 2/Assignments - (12th Week): 20%

Final Exam: 40%

### COURSE DESCRIPTION

This course provides an introduction to the fundamental principles of cryptography and its applications on the network security domain. The course covers a broad variety of important security topics, such as cryptography, authentication, network vulnerabilities and attacks, network intrusion detection and tools to defend against network attacks. The course introduces also the applications of discrete mathematics and number theory in the design of modern cryptographic algorithms.

### TEXT BOOK

William Stallings, "Cryptography and Network Security: Principles and Practices", 6th Edition, Prentice- Hall.

### REFERENCE BOOKS

Bruce Schneier, "Applied Cryptography", 2nd Edition, Wiley.

Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, latest edition.

### COURSE AIM

The aim of the course is to teach the principles and practice of communication security. The emphasis of the course is on the underlying principles and techniques of network security including policies, cryptoanalysis, symmetric and asymmetric cryptography, and authentication protocols. At the end of the course, a student will have an understanding of the challenges in network security and to what extent these challenges can be addressed with today's network technologies.

## COURSE OBJECTIVES

Upon successful completion of the course, a student will be able to:

- Understand the threats and vulnerabilities that are specific of a networked environment, and explain countermeasures including firewalls and intrusion detection systems.
- Obtain a technical understanding of the main cryptographic concepts and technologies available today, including symmetric and asymmetric encryption, hashing, and digital signatures.
- Identify the Security Goals (Confidentiality, Integrity, and Availability and) based on the Security Requirements.
- Understand the purpose of security protocols and be witness to the difficulties of their verification
- Internalized the fundamental notions of threat, vulnerability, attack and countermeasure.
- Identify Security Requirements based on the needs of the clients/organization.
- Validate the Security Requirements for satisfying the security Goals.

## COURSE OUTLINE

Week Number 1: Goals of data & information security and Threats -Types of Attacks.

Week Number 2: Classical Encryption Techniques.

Week Number 3: Block Ciphers and the Data Encryption Standard (DES).

Week Number 4: Advanced Encryption Standard (AES).

Week Number 5: Pseudo Random Number Generation and Stream Ciphers

Week Number 6: Hashing Algorithms.

Week Number 7: 7th week exam.

Week Number 8: Message Digests and Message Authentication Code.

Week Number 9: Basic Concepts in Number Theory and Finite Fields.

Week Number 10: Public key Cryptography and RSA.

Week Number 11: Digital Signatures & Authentication Protocols.

Week Number 12: 12th week exam.

Week Number 13: Key Management and Distribution.

Week Number 14: Securing Traffic: Email and Web Security.

Week Number 15: Firewalls and Intrusion Detection Systems.

Week Number 16: Revision and start of final exam.

## CC 521 - Micro-Computer Based Design

### COURSE INFORMATION

Course Title: Micro-Computer Based Design

Code: CC 521

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 415.

### GRADING

Class Performance/Attendance: 10%

Midterm # 1/Assignments - (7th Week): 30%

Midterm # 2/Assignments - (12th Week): 20%

Final Exam: 40%

### COURSE DESCRIPTION

Need for micro based systems, Design cycle for micro based system, Different platforms for embedded systems, FPGAs as a platform for micro based systems, Comparing between microprocessors and micro-controllers. I/O interfacing, Programming of micro controllers embedded systems, Hardware / software portioning and Integration

### TEXT BOOK

Mohamed Rafiquzzaman, "The AVR microcontrollers and embedded systems" , Pearson

### REFERENCE BOOKS

Mohamed Rafiquzzaman , "Microprocessors and Microcomputer Based System design", CRC Pub., latest edition.

### COURSE AIM

Understand the complete design cycle and different platforms for micro based systems. Study interfacing standards and hardware/ software portioning.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

Understanding how to design and implement a complete micro based system

## COURSE OUTLINE

| | |
|---|---|
| Week Number 1: | Introduction to Micro based systems. |
| Week Number 2: | Embedded systems design cycle, Memory and Operating System for embedded systems. Lab: Programming micro controllers using assembly language. |
| Week Number 3: | Embedded system design considerations and Challenges. Lab: Programming microcontrollers using C - part 1. |
| Week Number 4: | Programmable devices and FPGAs. Lab: Interfacing with 7-segment display. |
| Week Number 5: | Microprocessors Vs. Microcontrollers. Lab: Interfacing with keypad. |
| Week Number 6: | I/O interface ISA bus. Lab: Serial port communication |
| Week Number 7: | 7th week exam. |
| Week Number 8: | I/O interface cont. Lab: Interfacing with ADC and DAC. |
| Week Number 9: | Interface standards for external devices. Lab: Motor control |
| Week Number 10: | Ethernet Network interface. Lab: Sensor interfacing |
| Week Number 11: | 12th Week Exam. |
| Week Number 12: | Real Time operating System. Lab: Design of final project. |
| Week Number 13: | Real Time operating systems cont. Lab: CAD Design tools. |
| Week Number 14: | Presentation of project. |
| Week Number 15: | Final Exam. |

## CC 523 - Computer Design and Performance Evaluation

### COURSE INFORMATION

Course Title: Computer Design and Performance Evaluation

Code: CC 523

Hours: Lecture - 2 Hrs. Tutorial / lab - 2 / 2 Hrs. Credit - 3.

Prerequisite: CC 311.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Comparison between the two major design methodologies based on ISA (Instruction Set Architecture) and ASA (Application Specific Architecture). The course covers the topics of queuing theory and Markov processes as a tool for computer system performance evaluation. Moreover, the students are introduced to operational analysis techniques regarding performance of computer systems.

### TEXT BOOK

M.Mano, C.R.Kime, "Logic and Computer Design Fundamentals", Prentice Hall, latest edition.

### REFERENCE BOOKS

- M. Mano, "Computer System Architecture", Englewood Cliffs, NY: Prentice Hall, latest edition.
- Patterson, D.A., and Hennessy J. L., "Computer Organization and Design: The Hardware/Software Interface", Morgan Kaufmann, latest edition.

### COURSE AIM

The course introduces the student to the principles of design, build and test of special-purpose processors. Moreover, the students are introduced to the concepts of evaluating the performance of such processors. It is intended for the final year BS. Students or first year graduates specializing in computer engineering

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

The course introduces the student to the principles of design, build and test of special-purpose processors. Moreover, the students are introduced to the concepts of evaluating the performance of such processors. It is intended for the final year BS. Students or first year graduates specializing in computer engineering.

## COURSE OUTLINE

Week Number 17: Introduction to ISA-based Computer Design, Sequencing and Control.

Week Number 18: Hardwired and Micro-Programmed Control.

Week Number 19: Single-Cycle Hardwired Control and Multiple-Cycle Micro-Programmed Control.

Week Number 20: Pipelined Control and Performance Evaluation.

Week Number 21: Instruction Set Architecture and Addressing Evaluation.

Week Number 22: Central Processing Unit Design.

Week Number 23: 7th week exam.

Week Number 24: High Performance CPU Concepts.

Week Number 25: Design Parameters; Area, Time and Cost.

Week Number 26: Operational Analysis.

Week Number 27: M/G/I Queuing model.

Week Number 28: 12th Week Exam.

Week Number 29: Discrete-Time Markov Chains.

Week Number 30: Benchmark System Evaluation.

Week Number 31: Revision

Week Number 32: Final Exam.

## CC 524 - Neural Networks

### COURSE INFORMATION

Course Title: Neural Networks

Code: CC 524

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 112 - BA323.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Introduction to basic concepts of neural networks.The basic neuron.The multilayer perceptron. Artificial neural networks: applications, learning, and architecture. Competitive neural networks.Kohonen self-organizing networks.Adaptive reasoning theory (ART).Hopfield neural networks.Neural networks implementation. Neural networks applications.

Introduction to MATLAB environment. Single perceptron, Multilayer perceptron, Competitive networks, Kohonen networks, ART networks, And Hopfield networks using MATLAB.

### TEXT BOOK

- Simon Haykin, "Neural Networks: A Comprehensive Foundation", Prentice Hall, latest edition.

### REFERENCE BOOKS

- Martin T. Hagan, Howard B. Demuth and Mark H. Beale, "Neural Network Design", Martin Hagan, latest edition.
- MATLAB neural networks toolbox, user guide, latest version.

## COURSE AIM

This course will provide students with detailed skills to use Artificial neural networks for solving many types of engineering problems such as mapping, clustering, and constrained optimization, in such areas as pattern recognition, signal processing, and control systems.

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Explain the basic concepts of neural networks.
- Discuss a wide variety of neural networks with architecture, training, algorithms, and applications.
- Demonstrate the architecture, training, and applications of a wide variety of neural networks using MATLAB simulation package.

## COURSE OUTLINE

Week Number 1: Introduction to basic concepts of neural networks, applications and different architectures.

Week Number 2: Perceptron Network and Perceptron Learning Rule.

Week Number 3: Multilayer Perceptron and Back-propagation Learning Rule.

Week Number 4: Building Neural networks using MATLAB.

Week Number 5: Competitive neural networks.

Week Number 6: Kohonen self-organizing learning rules.

Week Number 7: 7th Week Exam

Week Number 8: Hebbian networks and Hebbian learning rule.

Week Number 9: Adaptive reasoning theory (ART) - part 1.

Week Number 10: Adaptive reasoning theory (ART) - part 2.

Week Number 11: Hopfield neural networks.

Week Number 12: 12th Week Exam

Week Number 13: Neural networks implementation.

Week Number 14: Neural networks case studies & term work Projects - part 1.

Week Number 15: Neural networks case studies & term work Projects - part 2.

Week Number 16: Final Exam.

## CC 525 - Intelligent Robotics

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Intelligent Robotics | | |
| Code: | CC 525 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial - 2 Hrs. | Credit - 3. |
| Prerequisite: | CC 319 - EE 418. | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Introduction, History, Applications, Object rotation, General transformations, Forward Kinematics, Inverse kinematics, Machine intelligence, trajectory generation, Control, Applications and practical Considerations.

### TEXT BOOK

- Mark Song, "Robot Modeling and Control", John Wiley, latest edition.

### REFERENCE BOOKS

- J. J. Craig, "Introduction to Robotics Mechanics and Control", Prentice Hall, latest edition.
- Phillip j. McKerrow, "Introduction to Robotics", Addison Wesley, latest edition.

### COURSE AIM

To teach students the principles and techniques of designing intelligent robotic systems.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- Understanding the basic principles of robot manipulator systems
- Study the kinematics, Static, and Dynamics of a robotic system
- Study the problem of trajectory planning

- Understanding the different types of sensors and their use in the different robotic applications
- Explaining robot arm and motion control
- Design and implementation of an intelligent robot

**COURSE OUTLINE**

Week Number 1: Introduction.

Week Number 2: Object location.

Week Number 3: General transformation.

Week Number 4: Kinematics: Homogenous Transformation.

Week Number 5: Kinematics: Forward / Inverse kinematics.

Week Number 6: Introduction to AI.

Week Number 7: 7th week Exam.

Week Number 8: Robot Sensors.

Week Number 9: Image Processing.

Week Number 10: Pattern recognition and computer vision.

Week Number 11: Autonomous Mobile Robots.

Week Number 12: 12th week Exam.

Week Number 13: Trajectory planning for Robot.

Week Number 14: Robot Control.

Week Number 15: Revision.

Week Number 16: Application.

# CC 527 - Computer Aided Design

## COURSE INFORMATION

Course Title: Computer Aided Design

Code: CC 527

Hours: Lecture - 2 Hrs. Tutorial / lab- 2/2 Hrs. Credit - 3.

Prerequisite: CC 311 ,CC341.

## GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

## COURSE DESCRIPTION

To introduce fundamental algorithms and techniques for computer aided integrated circuit design. It covers aspects of design flow, physical design, logic optimization, timing analysis and verification, synthesis for testability.

## TEXT BOOK

Neil H. E. Weste and Kamran Eshraghian, "Principles of CMOS VLSI Design, a Systems Perspective", Addison - Wesley, latest edition.

## REFERENCE BOOKS

- Steven M. Rubin, "Computer Aids for VLSI Design", Addison -Wesley, latest edition.
- D. Pucknell and K. Eshraghian, "Basic VLSI Design, Systems and Circuits", Prentice Hall, latest edition.

## COURSE AIM

To learn new design technologies, large-scale designs using VLSI technology and modern computer techniques used in Digital circuit designs & implementation.

## COURSE OBJECTIVES

Upon completion of this course the student will be able to:

- To produce highly qualified and skilled engineers who can cope with state of the art technologies in digital circuit design & implementation

## COURSE OUTLINE

| | |
|---|---|
| Week Number 1: | Introduction to CMOS Circuits. |
| Week Number 2: | Circuit & system Representation. |
| Week Number 3: | Circuit Characterization. |
| Week Number 4: | Circuit performance estimation. |
| Week Number 5: | Interconnect and Wiring. |
| Week Number 6: | Combinational Circuit Design. |
| Week Number 7: | 7th week Exam. |
| Week Number 8: | Sequential Circuit Design. |
| Week Number 9: | Design methodology and Tools. |
| Week Number 10: | Datapath subsystems - part 1. |
| Week Number 11: | Datapath subsystems - part 2. |
| Week Number 12: | 12th week Exam. |
| Week Number 13: | Design tools I. |
| Week Number 14: | Design tools II. |
| Week Number 15: | Revision. |
| Week Number 16: | Final exam. |

## CC 528 - Computer Systems Performance Analysis

### COURSE INFORMATION

Course Title: Computer Systems Performance Analysis

Code: CC 528

Hours: Lecture - 2 Hrs. Tutorial / lab - 2/2 Hrs. Credit - 3.

Prerequisite: 138 credits.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

The purpose of this course is to introduce the student to the principles and techniques of performance measurement in the analysis of computer systems. Such techniques are used to detect bottlenecks, measure the efficiency of computer systems and applications.

### TEXT BOOK

Raj Jain, "The Art of Computer Systems Performance Analysis", John Wiley and Sons, Inc, latest edition.

### COURSE AIM

The student will be introduced to performance measurement techniques, basic principles of queuing theory, experimental design, among others. The student will be expected to do individual assignments. Assignments are to be done individually. The course will consist of both lectures and class discussions.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to: produce highly qualified and skilled engineers who can cope with state of the art technologies in performance analysis and design

## COURSE OUTLINE

Week Number 1: Introduction to Performance Analysis.

Week Number 2: Approaches to Performance Analysis.

Week Number 3: Workloads.

Week Number 4: Simulation

Week Number 5: Experimental Design: k Factors with 2 levels.

Week Number 6: Experimental Design: k Factors, 2 levels with Replication.

Week Number 7: 7th week Exam

Week Number 8: Experimental Design: 2 Factors with multiple levels..

Week Number 9: Experimental Design: 1 Factor Designs.

Week Number 10: Experimental Design: Fractional Factorial Designs.

Week Number 11: Operational Analysis. .

Week Number 12: 12th week Exam.

Week Number 13: More Operational Analysis.

Week Number 14: Introduction to Queuing Theory.

Week Number 15: Revision.

Week Number 16: Final exam.

## CC 529 - Distributed and Parallel Systems

### COURSE INFORMATION

Course Title: Distributed and Parallel Systems

Code: CC 529

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: CC 418, CC 431.

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

This course studies the fundamental aspects of distributed systems and applications. Early foundations and recent developments in distributed systems will be investigated. Both client-server and peer-to-peer application designs will be discussed. Other topics include sockets, reliability, replication, group membership protocols, clock synchronization, and logical timestamps.

### TEXT BOOK

Andrew S. Tanenbaum and Maarten van Steen, "Distributed Systems: Principles and Paradigms", Prentice Hall, latest edition.

### COURSE AIM

This course studies the fundamental aspects of distributed systems and applications. Early foundations and recent developments in distributed systems will be investigated. Both client-server and peer-to-peer application designs will be discussed. Other topics include sockets, reliability, replication, group membership protocols, clock synchronization, and logical timestamps.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to produce highly qualified and skilled engineers who can cope with state of the art technologies in distributed systems

## COURSE OUTLINE

Week Number 1: Introduction to distributed architectures.

Week Number 2: Types of distributed systems.

Week Number 3: Distributed System Architecture.

Week Number 4: Process, Thread and Virtual Machine.

Week Number 5: Communication and Distributed System.

Week Number 6: Naming, Identification and address.

Week Number 7: 7th week exam.

Week Number 8: Introduction to Parallel System.

Week Number 9: Parallel System Architecture.

Week Number 10: Parallel System Memory Models.

Week Number 11: Parallel Program Platform

Week Number 12: 12th week Exam.

Week Number 13: Distributed Vs. Parallel Systems.

Week Number 14: Distributed systems Applications (Part 1).

Week Number 15: Distributed systems Applications (Part 2)

Week Number 16: Final exam.

## CC 531 - Advanced Networks

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Advanced Networks | | |
| Code: | CC 531 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial - 2 Hrs. | Credit - 3. |
| Prerequisite: | CC 431. | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

This course covers a set of advanced topics in computer networks. The focus is on principles, architectures and protocols used in Switched Local Area Networks, Wireless, Mobile ad hoc NETworks, and multimedia networks. Topics include: LAN Multiple Access Protocols, Link Layer Error Detection and Correction Techniques, Link Layer Addressing and switches- ARP- CDMA-WiFi: architecture, CSMA/CA-Frame Format- Mobility Management: addressing and Routing-Mobile IP-Multimedia Networking Applications,-VoIP-RTP-SIP-QoS- Diffserv.

### TEXT BOOK

Douglas E. Comer, "Computer Networks and Internets", Pearson Education, latest edition

### REFERENCE BOOKS

Yi-lin Bing, Imrich Chlamtac "Wireless and Mobile Network Architectures", Wiely, latest edition.

William Stallings, "Local and Metropolitan Area Networks", Prentice Hall, latest edition.

### COURSE AIM

The course introduces students to the principles, architectures and protocols used in Switched Local Area Networks, Wireless, Mobile ad hoc NETworks, and multimedia networks.

### COURSE OBJECTIVES

Upon completion of this course the student will be able to analyze LAN, mobile and wireless networks and Multimedia networking.

## COURSE OUTLINE

| | |
|---|---|
| Week Number 1: | Link Layer: Introduction and Services, Error Detection and Correction Techniques. |
| Week Number 2: | Multiple Access Protocols. |
| Week Number 3: | Link- Layer Addressing, Ethernet. |
| Week Number 4: | Link Layer Switches |
| Week Number 5: | PPP: The Point-to-Point Protocol. |
| Week Number 6: | A Day in the Life of a Web Page Request. |
| Week Number 7: | 7th week exam. |
| Week Number 8: | Wireless and Mobile Networks: Introduction, Wireless Links and Network Characteristics. |
| Week Number 9: | WiFi: 802.11 Wireless LANs. |
| Week Number 10: | Mobility Management: Principles, Mobile IP, Wireless and Mobility: Impact on Higher Layer Protocols. |
| Week Number 11: | Multimedia Networking Applications, Streaming Stored Video |
| Week Number 12: | 12th Week Exam. |
| Week Number 13: | Voice-over- IP. |
| Week Number 14: | Protocols for Real-Time Conversational Applications: RTP and SIP. |
| Week Number 15: | Network Support for Multimedia. |
| Week Number 16: | Final Exam. |

## CC 535 - Internetwork Security

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Internetwork Security | | |
| Code: | CC 535 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial - 2 Hrs. | Credit - 3. |
| Prerequisite: | CC431 | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Hacking and the Law, Network Mapping, Vulnerability Assessment, Network Mapping tools,Vulnerability Scanners, Sniffing, Defenses, Denial of Service Techniques using address spoofing, Man-in-the-middle, Defenses, Stack-Based Buffer Overflow Attacks and

Password Attacks and Cracker tools, Web Attacks, RootKits, Trojans and Backdoors, Intrusion Detection tools, Writing new intrusion detection signatures, HoneyNets, Forensics

### TEXT BOOK

McClure, Scambray, and Kurtz, "Hacking Exposed ", McGraw-Hill, latest edition.

### REFERENCE BOOKS

S.Bellovin and W.Chesvick, "Internet Security and Firewalls", Addison-Wesley, latest edition.

## COURSE AIM

Hands on experimentation and evaluation of Internet Security theory, principles, and practices. Laboratory component involves implementing both defensive and offensive security techniques..

## COURSE OBJECTIVES

Upon completion of this course the student will be able to perform ethical hacking and access the security of networks and computer systems.

## COURSE OUTLINE

Week Number 1: Legal and Moral Responsibilities.

Week Number 2: Network Reconnaissance Techniques.

Week Number 3: IP Address Spoofing.

Week Number 4: Gaining Access.

Week Number 5: Maintaining Access.

Week Number 6: Intrusion Detection.

Week Number 7: 7th week exam.

Week Number 8: Firewalls.

Week Number 9: Wireless Networks Security.

Week Number 10: Worms and Viruses.

Week Number 11: Virtual Private networks.

Week Number 12: 12th week exam.

Week Number 13: Web Servers Security.

Week Number 14: Ethical Hacking.

Week Number 15: Overall Computer and Network Security Assessment.

Week Number 16: Final Exam.

## CC 537 - Computer Forensics

### COURSE INFORMATION

Course Title: Computer Forensics

Code: CC 537

Hours: Lecture - 2 Hrs. Tutorial/Lab - 2/2 Hrs. Credit - 3.

Prerequisite: Senior Standing 138 credits

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Conducting a computer forensics investigation- Examining the layout of a network- Finding hidden data- Capturing images- Identifying, collecting, and preserving computer evidence- Understanding encryption and examining encrypted files- Documenting the case- Evaluating common computer forensic tools- Presenting and analysing computer evidence.

### TEXT BOOK

Linda volonino, Reynaldo anzalduwa Computer Forensics: principles and practices, Prentice Hall, Latest edition

### REFERENCE BOOKS

Aaron Philipp, David Cowen, and Chris Davis, "Hacking Exposed Computer Forensics: Computer Forensics Secrets and Solutions", McGraw-Hill Osborne Media, latest edition.

Michael Solomon, Neil Broom, Diane Barrett, "Computer Forensics JumpStart", Wiley, latest edition.

### COURSE AIM

It offers a complete overview of the basic skills and available certifications in computer forensics.

## COURSE OBJECTIVES

The course introduces a selection of topics in computer forensics. The student will be able to:

- document electronic evidence
- Analyze searched for and bookmarked data
- Mind and find the Loopholes in a computer system
- Analyze signatures and hashes

## COURSE OUTLINE

Week Number 1: Computer Forensics: an overview.

Week Number 2: Computer Hardware overview.

Week Number 3: File Systems.

Week Number 4: Conducting a computer forensics investigation.

Week Number 5: Acquiring Digital Evidence.

Week Number 6: File Signatures analysis and hash analysis.

Week Number 7: 7th week exam.

Week Number 8: Windows operating system artifacts

Week Number 9: Creating paperless reports.

Week Number 10: Computer Forensic Investigations - Document Forensics.

Week Number 11: Computer Forensic Investigations - Mobile Forensics - part 1.

Week Number 12: 12th week exam.

Week Number 13: Computer Forensic Investigations - Mobile Forensics - part 2

Week Number 14: Computer Forensic Investigations - Network Forensics.

Week Number 15: Computer Forensic Investigations - Investigating X-Files.

Week Number 16: Final Exam.

## CC 539 - Selected in Topics in Networks

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Selected in Topics in Networks | | |
| Code: | CC 539 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial - 2 Hrs. | Credit - 3. |
| Prerequisite: | CC531 | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Advanced topics in networking. Topics may include, but are not limited to: Internet analysis, routing techniques - Wireless Networking - Mobile Networks - Sensor Networks - Content-Based Networking - Autonomic Networks - Network Optimization.

### TEXT BOOK

No specific textbook, lecture notes and exerts from literature will be handed out to students.

### REFERENCE BOOKS

Collection of papers from IEEE ACM Journals.

### COURSE AIM

This course presents selected topics in networks aiming to introduce the student to the latest state of the art networking issues.

## COURSE OBJECTIVES

This course presents selected topics in networks

## COURSE OUTLINE

Week Number 1: Overview

Week Number 2: TCP/IP, IPv6 and Internet.

Week Number 3: Wireless Networking -Setup, Security and Hotspotting

Week Number 4: Wireless and Mobile networks.

Week Number 5: MANET analysis and routing.

Week Number 6: Network Optimization

Week Number 7: 7th Week Exam

Week Number 8: Multimedia networking.

Week Number 9: Networking in Cloud Computing

Week Number 10: Sensor Networks- Network Architecture

Week Number 11: Sensor Networks-Topology Control

Week Number 12: 12th Week Exam

Week Number 13: Data-Centric Networking

Week Number 14: Content-Based Networking

Week Number 15: Quality of Service

Week Number 16: Final Exam

## CC 540 - Computer Systems Engineering

### COURSE INFORMATION

Course Title: Computer Systems Engineering

Code: CC 540

Hours: Lecture - 2 Hrs. Tutorial - 2 Hrs. Credit - 3.

Prerequisite: Senior Standing 138 credits

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

The course objective is to integrate key topics from algorithms, computer architecture, operating systems, compilers, and software engineering, in one unified framework. This will be done constructively, by building a general-purpose computer system from the ground up. In the process, many ideas and techniques used in the design of modern hardware and software systems are explored, and major trade-offs and future trends are discussed. Throughout the course, the student gains many cross-section views of the computing field, from the bare bone details of switching circuits to the high level abstraction of object-based software design.

### TEXT BOOK

Nisan and Schocken, "The Elements of Computing Systems", MIT Press, latest edition.

### REFERENCE BOOKS

Selected Papers from Journals and Transactions.

### COURSE AIM

This is mostly a hands-on course, which evolves around implementing a series of hardware and software modules to integrate key topics from algorithms, computer architecture, operating systems, compilers, and software engineering, in one unified framework.

## COURSE OBJECTIVES

This is mostly a hands-on course, which evolves around implementing a series of hardware and software modules. Each module development task will be accompanied by a design document and an executable solution (illustrating what the module is supposed to do), a detailed implementation document (proposing how to build it), and a test script (specifying how to test it).

## COURSE OUTLINE

Week Number 1: Course Overview and demonstration of some games

Week Number 2: Boolean arithmetic

Week Number 3: Sequential Logic

Week Number 4: Machine Language

Week Number 5: Computer Architecture

Week Number 6: Assembler

Week Number 7: 7th week exam

Week Number 8: Virtual machine I

Week Number 9: Virtual machine II

Week Number 10: High Level Language

Week Number 11: Compiler I

Week Number 12: 12th week

Week Number 13: Compiler II

Week Number 14: Operating System I

Week Number 15: Operating System II

Week Number 16: Final Exam

## CC 550 - Selected Topics in Computing

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Selected Topics in Computing | | |
| Code: | CC 550 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial - 2 Hrs. | Credit - 3. |
| Prerequisite: | Senior Standing 138 credits | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Fundamental concepts and issues related to the design and analysis of advanced computing which includes multithreaded, parallel, and distributed computing. This course introduces a discussion of programming techniques, applications, implementations, and performance issues. In addition, selected topics from the following list will also be covered: load balancing, task scheduling, fault-tolerance, coordination & agreement, distributed objects & remote invocation, and distributed transactions & concurrency control. It also gives an introduction to real-time systems, reconfigurable computing, and some advanced topics.

### TEXT BOOK

M. Ben-Ari, "Principles of Concurrent and Distributed Programming: Algorithms And Models", prentice-hall, latest edition.

Scott hauck, Andre Dehon, "Reconfigurable Computing: The Theory And Practice of FPGA-Based Computation", Morgan Kaufmann, latest edition.

### REFERENCE BOOKS

Christophe Bobda, "Introduction to Reconfigurable Computing Architectures, Algorithms, and Applications", Springer Verlag, latest edition.

Gregory Andrews, "Foundations of Multithreaded, Parallel, and Distributed Programming", Addison-Wesley, latest edition.

## COURSE AIM

To present fundamental algorithms and impossibility results from the concurrent programming literature, and to cover techniques for formally specifying and verifying concurrent systems. Some advanced computing systems will be covered such as embedded systems, reconfigurable computing and real-time systems.

## COURSE OBJECTIVES

The course introduces a selection of advanced topics in computer systems architecture and systems software and their relationships. It deals with design issues, implementation techniques, and structure and use of tools to support the implementation of computer systems and complex systems software.

## COURSE OUTLINE

Week Number 1: Concurrent Programming concepts: an overview.

Week Number 2: Techniques for parallelizing programs.

Week Number 3: Synchronization algorithms for shared-memory systems.

Week Number 4: Distributed Programming: an overview.

Week Number 5: Fault-Tolerance in Distributed Systems.

Week Number 6: Parallel Programming: Languages, Libraries, and Tools.

Week Number 7: 7th week exam.

Week Number 8: System Design for maintainability and power efficiency

Week Number 9: Embedded Systems.

Week Number 10: Cloud Computing.

Week Number 11: Polymorphic processors.

Week Number 12: 12th week exam.

Week Number 13: Real-time Systems

Week Number 14: Reconfigurable computing.

Week Number 15: High performance Computing.

Week Number 16: Final Exam.

## CC 552 - Web Engineering

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Web Engineering | | |
| Code: | CC 552 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial / lab - 2/2 Hrs. | Credit - 3. |
| Prerequisite: | CC212 | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

Provides an introduction to the discipline of Web Engineering. This course aims to introduce the methods and techniques used in Web-based system development. This course draws upon previous programming and computing experience to develop practical web development and maintenance skills. The course teaches the students the Object Oriented techniques, Design, Analysis using HTML, CSS, Java Script, PHP, MYSQL, ASP.NET, and Ajax. This course is intended for students with knowledge of both Internet communication concepts and an introductory programming knowledge..

### TEXT BOOK

Beginning PHP5, Apache, and MySQL Web Development by Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass.

### REFERENCE BOOKS

Roger Pressman, David Lowe, "Web Engineering: A Practioner's Approach, 2008

### COURSE OBJECTIVES

Provides an introduction to the discipline of Web Engineering. This course aims to introduce the methods and techniques used in Web-based system development. This course draws upon previous programming and computing experience to develop practical web development and maintenance skills. The course teaches the students the Object Oriented techniques, Design, Analysis using HTML, CSS, Java Script, PHP, MYSQL, ASP.NET, and Ajax. This course is

intended for students with knowledge of both Internet communication concepts and an introductory programming knowledge..

## COURSE OUTLINE

Week Number 1: Introduction to web engineering (WebE), applications and Web Applications

Week Number 2: Web System Design Disciplines, Tools & Methods

Week Number 3: HTML : general introduction - basic tags, HTML5

Week Number 4: CSS selectors, properties of CSS

Week Number 5: Basic of Java Script

Week Number 6: Understand of Document Object Model (DOM)

Week Number 7: 7th Week Exam.

Week Number 8: DHTML, Basics of PHP

Week Number 9: PHP and MYSQL Web Development

Week Number 10: PHP and file 1/0

Week Number 11: PHP5

Week Number 12: 12th Week Exam.

Week Number 13: ASP.NET (PART I)

Week Number 14: ASP.NET (PART II)

Week Number 15: Introduction to Ajax, Term work project using PHP and ASP.NET.

Week Number 16: Final Exam.

## CC 553 - Mobile Applications

### COURSE INFORMATION

| | | | |
|---|---|---|---|
| Course Title: | Mobile Application | | |
| Code: | CC 553 | | |
| Hours: | Lecture - 2 Hrs. | Tutorial / lab - 2/2 Hrs. | Credit - 3. |
| Prerequisite: | CC316 and CC414 | | |

### GRADING

| | |
|---|---|
| Class Performance/Attendance: | 10% |
| Midterm # 1/Assignments - (7th Week): | 30% |
| Midterm # 2/Assignments - (12th Week): | 20% |
| Final Exam: | 40% |

### COURSE DESCRIPTION

- This course introduces MOBILE APPLICATION DEVELOPMENT to students who are already familiar with java Programming language and database systems. Advanced features of MOBILE APPLICATION DEVELOPMENT will be introduced through applications. Among those advanced features: Building Graphical User Interface (GUI), Access mobile resources (Camera, Sensors, Bluetooth), processing Multimedia resources (Video and Audio processing), Location tracking and map allocation, Android storage options and data management (database connectivity using SQLite), and Animations applications.
- The course also covers mobile application fundamentals, application components, intents, application anatomy compression between multiple mobile operating system and define android architecture and its platform.

### TEXT BOOK

Introduction to Android Application Development: Android Essential, by Joseph Annuzzi Jr. Lauren Darcey and Shane Conder, Fourth Edition.

### REFERENCE BOOKS

- The Android Developer's Cookbook, James Steele, Nelson To
- Professional Android Sensor Programming , Greg Milette , Adam Stroud

## COURSE OBJECTIVES

- This course introduces MOBILE APPLICATION DEVELOPMENT to students who are already familiar with java Programming language and database systems. Advanced features of MOBILE APPLICATION DEVELOPMENT will be introduced through applications. Among those advanced features: Building Graphical User Interface (GUI), Access mobile resources (Camera, Sensors, Bluetooth), processing Multimedia resources (Video and Audio processing), Location tracking and map allocation, Android storage options and data management (database connectivity using SQLite), and Animations applications.
- The course also covers mobile application fundamentals, application components, intents, application anatomy compression between multiple mobile operating system and define android architecture and its platform.

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## COURSE OUTLINE

Week Number 1: Introduction to mobile application development.

Week Number 2: Android Architecture and platforms.

Week Number 3: Mobile application fundamentals.

Week Number 4: Design of Graphical user interface.

Week Number 5: Access mobile resources Storage (Contact, Gallery, GPS)

Week Number 6: Processing Multimedia resources (Images, Audio and Video).

Week Number 7: 7th Week Exam.

Week Number 8: Continue with access mobile resources (Bluetooth, Sensors)

Week Number 9: Accessing Google Map.

Week Number 10: Linking with database SQLite.

Week Number 11: Graphics and Animations.

Week Number 12: 12th Week Exam.

Week Number 13: Introduction to interfacing with external Micro-controller.

Week Number 14: Continue with mobile interfacing and mobile based Control system.

Week Number 15: Projects and Case studies.

Week Number 16: Final Exam.