SYLLABUS

FOR

INTEGRATED MASTER OF SCIENCE
IN
ELECTRONICS, COMPUTER AND
INSTRUMENTATION
[M.Sc. (ECI)]

A Five year Degree Course

SAURASHTRA UNIVERSITY
RAJKOT
(Effective from June 2010)

Department of Electronics
Saurashtra University Campus
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SAURASHTRA UNIVERSITY
DEPARTMENT OF ELECTRONICS
M.Sc. (ECI) SYLLABUS
SEMESTER VII TO X

SEMESTER VII (24 Credits)
Paper-25 Advance Microprocessor (4 Credits)
Paper-26 Advance Instrumentation (4 Credits)
Paper-27 Robotics (4 Credits)
Paper-28 Fiber Optics (4 Credits)
Practicals (8 Credits)

SEMESTER VIII (24 Credits)
Paper-29 Introduction to Matlab (4 Credits)
Paper-30 Advance Computer Concept & Networking (4 Credits)
Paper-31 JAVA: Fundamentals and Practice (4 Credits)
Paper-32 VHDL: Fundamentals and Practice (4 Credits)
Practicals (8 Credits)

SEMESTER IX (24 Credits)
Paper-33 LAB VIEW: An Introduction (4 Credits)
Paper-34 Website Development using MYSQL, PHP and html (4 Credits)
Paper-35 Basic Programmable Controllers (4 Credits)
Paper-36 Automobile and Automative Electronics (4 Credits)
Practicals (8 Credits)

SEMESTER X (24 Credits)
Paper-37 Futuristic Electronics and Technology (4 Credits)
Paper-38 Digital Signal Processing (4 Credits)
Paper-39 Industrial Electronic devices (4 Credits)
Paper-40 Elective Paper (4 Credits)

I:- Radar and Navigation
II:- Microwave Electronics
III:- Bio-Medical Instrumentation
IV:- Electromagnetics
Practicals (8 Credits)
Unit 1: 8086 and supporting chips

Features of 8086-8086 internal architecture-the execution unit-the bus interface unit-segment registers - IP register-Memory segmentation-Physical address generation – pin diagram of 8086 – Even and odd memory banks for 8086


Unit 2: Memory, I/O interfacing and interrupt of 8086

Memory interfacing – generalized block schematic of memory interfacing – decoder logic using programmable array logic – address decoding techniques – interfacing EPROM and RAM – SRAM interfacing- interfacing EPROM/RAM device to 8086 using PROM – dynamic RAM – interfacing example

I/O mapped I/O, interfacing 16-bit Input/Output port – memory mapped I/O – comparing memory mapped I/O and I/O mapped I/O.

Unit 3: Addressing modes, instruction and introduction to assembly language programming

Addressing modes – instruction encoding format – segment override prefix – Data movement instruction – Arithmetic instructions – Bit manipulation instructions – program control instructions – string instructions

Introduction to assembly language programming – development of an assembly language program – program development tools – assembly language structure – structure programming

Subroutines/procedures – macros – timing and delay loops.

Unit 4: Programming examples

Average of block of N bytes – reverse the contents of block of N bytes and transfer them from source to destination – Find maximum number in array – Find the number of negative numbers in the array – checking the parity of number is odd or even – add two 3x3 matrices – Subtract two 3x3 matrices – Find the square of a number – Find the factorial of a number – Find the factorial of a number using recursive procedure – find the LCM of two number – find the GCD of two numbers – find \(^\binom{n}{r}\) of a number – find Fibonacci series of N given terms – Multiply two 16-bit signed numbers-Divide 16-bit signed numbers by a 16-bit signed numbers – Divide two BCD numbers – add two 8-bit ASCII numbers – ASCII to binary conversion – Binary to ASCII conversion – ASCII to BCD conversion – BCD to ASCII conversion – compare given strings – operation on strings – concatenate two strings using procedure – find the string length of the given string – Reverse the given string – occurrence of substring in the given string – case conversion

Recommended Book

1. Advanced microprocessor
   By: U.S.Shah
   Tech-max publication,Pune

Reference Book

1. Microcomputer systems:- The 8086/8088 family architecture, programming and design
   Liu and G.A.Gibson
   Prantice-Hall of India

M.Sc. (ECI)
Department of Electronics
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Unit 1: WAVE ANALYZERS, HARMONIC DISTORTION AND MEASURING INSTRUMENTS

INTRODUCTION – Basic wave analyzer – Frequency selective wave analyzer – Heterodyne wave analyzer – harmonic distortion analyzer – spectrum analyzer – digital Fourier analyzer, practical FFT spectrum analysis using a waveform processing software (ss-36)


Unit 2: Bridges and recorders


Unit 3: Transducers and signal conditioning


Operational amplifier – basic instrumentation amplifier – Application of instrumentation amplifiers – chopped and modulated DC amplifier – modulators

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Unit 4: Measurement set up and measurement of power


Requirements of dummy load – Bolometer – bolometer method for power measurement – Bolometer element – Bolometer mount – measurement of power by means of a bolometer bridge – unbalanced Bolometer Bridge – self balancing Bolometer bridge - measurement of large amount of RF power – measurement of power on a transmission line – standing wave ratio measurement – measurement of standing wave ratio using directional couplers.

Recommended Book

1. Electronic instrumentation
   By: H.S.Kalsi,
   Second edition
   Tata Mc Graw Hill

Reference Book

1. Electronic instrumentation and measurement
   By: Anand, PHI
2. Instrumentation, measurement and analysis
   By: Nikrs B C and Chaudhary K.K., TMN

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Unit 1: Introduction to robots, robotic manipulation and basics of kinematics:


Unit 2: Kinematics: Direct and inverse


Introduction of inverse kinematics – Definition of inverse kinematics – why inverse kinematics is not unique – configuration of tool – Relation between DK and IK


Unit 3: Work space analysis and trajectory planning.

Robot work space – work space envelope – work space analysis/work envelope of a four axis adept-1 SCARA robot – work space fixtures

Unit 4: Robotics vision and robot task planning:


Recommended Book

1. Fundamental of robotics
   By: T.C.Manjunath
   Nandu Printers and Publishers PVT LTD.
   Mumbai-400 071

Reference Book

1. Industrial robotics: Technology, programming and applications
   By: Mikell P. Groover, Mitchell Weiss,
   Roger N Nagel and Nicholas G.Odrey
   Mc Grow – Hill international Editions

2. Foundations of robotics: Analysis and control
   By: Tsuneo Yoshi Kawg

3. Applied Robotics: An introduction Book I and II
   By: Edwin wise
   Cengase learning (Indian edition)

4. Fundamentals of robotics: Analysis & control
   By: Robert J. Schilliny.
   Prentice- Hall of India (EEE)

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Paper 28: Fiber optics

Credit: 04

Total marks: 100(70 External+30 Internal)

Total Hours requires: 60 Hrs.

Unit 1: Optical fiber waveguides

Ray theory transmission-Electromagnetic theory for optical propagation – cylindrical fiber – single mode fibers

Unit 2: Transmission characteristics of optical fibers


Unit 3: Fiber, cables, joint and couplers


Fiber alignment and joint loss – Fiber splices - fiber connector – Expanded beam connectors – fiber couplers

Unit 4: Optical fiber measurements

Fiber attenuation measurements – fiber dispersion measurements – fiber refractive index profile measurements – fiber cutoff wavelength measurements – fiber numerical aperture measurements – fiber diameter measurement – mode field diameter for single mode fiber – reflectance and optical return loss – field measurements

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Recommended Book

1. Optical fiber communications: Principles and practice
   By: John M. Senior
   Pearson Education
   Low price - second edition.

Reference Book

1. Fiber optics through experiments
   Edition by: M.R. Shenoy, Sunil K Khijwania
   Ajay Ghatak, Bishnu P Pal
   Second edition
   Publisher: Viva Books Pvt Ltd, New Delhi

2. Fiber optical communication
   By: D.C. Agarwal
   S. Chand & Co.

3. An introduction to optical fiber
   By: Allen H. Cherin

4. Optical fiber communication
   By: Cerd Keiser.

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