

<u>B.E. ELECTRONICS ENGINEERING</u> FOURTH YEAR semester VII	
SUBJECT: Elective - I, Image Processing	
Lectures: 4 Hrs per week Practical: 2 Hrs per week	Theory: 100 Marks Term Work: 25 Marks Oral: 25 Marks
<i>Rationale: Image processing has grown considerably due to fast computational systems. Many important real life applications in diverse fields are therefore possible. This first course in image processing shall teach basic concepts in the subject.</i>	
DETAILED SYLLABUS	
Digital image processing systems	
Image acquisition, storage, processing, communication and display.	
Visual perception	
Structure of human eye, image formation in the human eye, brightness, adaptation and discrimination.	
Image model	
Uniform and non-uniform sampling and quantization.	
Discrete 2-D linear processing	
Superposition and convolution, unitary transforms, linear processing techniques.	
Image transforms 2-D DFT / FFT, Walsh, Hadamard Transforms, Discrete Cosine and Sine transforms, Haar Transform, Slant Transform, Hotelling Transform. Image enhancement	
Contrast manipulation, Histogram modification, noise cleaning, edge sharpening, frequency domain methods like low-pass and high-pass filtering, homomorphic filtering.	
Image segmentation	
Detection of discontinuity, point line and edge detection, edge linking and boundary detection, thresholding, image interpretation.	
Image Compression	
Coding redundancy. Psycho-visual redundancy. Fidelity criteria, MSE, fundamental coding theorem. Error -free compression, variable length coding .bit plane coding. Loss-less predictive coding. Lossy predictive coding, Transform coding, DPCM, DM, ADM.	
BOOKS	
Text Books: 1. W. Pratt, Digital Image Processing, Wiley Publication, third edition, 2002. 2. Gonzalez & Woods, Digital Image Processing, Pearson Education, Second edition. 3. A.K. Jain, Fundamentals of Image processing, Prentice Hall of India Publication, 1995	
Additional Reading:	

TERM WORK

- | |
|--|
| <ol style="list-style-type: none">1. Term work shall consist of at least six software programs written in C / MATLAB and two assignments covering the topics of the syllabus.2. A term work test shall be conducted with a weightage of 10 marks. |
|--|

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING

FOURTH YEAR semester VII

SUBJECT: Microcomputer System Design

Lectures: 4 Hrs per week

Practical: 2 Hrs per week

Theory: 100 Marks

Term Work: 25 Marks

Oral: 25 Mark

***Rationale :** A Microcomputer system is made of different components. This subject shall teach the functional units of these components and how to make them work together in a microcomputer system*

DETAILED SYLLABUS

The Pentium Processor

Functional units of Pentium processor. Overview of cache operation and cache types. Pentium cache overview. Pentium signals interface. Address bus, data bus, misaligned transfers, Communications with 8, 16, 32 and 64 Bit devices, bus control signals, bus master signals, System test and initialization. System management tools. Reliability and error reporting. Code cache and Instruction pipeline. Introduction to the prefetcher, Instruction branch prediction, code cache organization and operation, the floating point pipeline. The data cache and burst bus cycles. Introduction to internal data cache, structure of internal data cache, the bus cycle state machine, anatomy of write hit and miss, inquire cycles. Bus cycle overview, burst cycles, single transfer bus cycle - pipelined and non pipelined, special cycles. Interrupt acknowledge bus cycle, bus cycle state machine, bus and bus state transition.

PCI Bus

Local Bus concept. Introduction to PCI Bus operation; Introduction to Reflected wave switching, PCI Bus functional signal groups. PCI Bus Arbitration, Arbiter, Arbitration algorithms, hidden bus arbitration, example of arbitration between two masters, bus access latency, PCI read and write transfers, PCI I/O addressing, Interrupt acknowledge. Interrupt routing, Interrupt chaining.

Peripheral Bus Interfaces

The IDE interface, timing specifications, IDE protocol, Model of an IDE Disk Drive. SCSI Bus. SCSI hardware. SCSI Bus Protocol.

Universal Serial Bus (USB)

Introduction to USB, PC requirements, Bus topology, understanding the host and the peripheral, the development process. USB transfer basics, Elements of a transfer, successful transfers. Transfer types, Control transfer, Bulk transfer, Interrupt transfer, Isochronous transfer, time critical transfers.

BOOKS

Text Books:

3. Tom Shanley et al, Pentium Processor System Architecture, Addison Wesley Press
4. Tom Shanley et al, PCI System Architecture, Addison Wesley Press
5. F. Schmidt, SCSI Bus and IDE Interface, Addison Wesley Press
6. Jan Axelson, USB Complete, Penram Publication, second edition

Additional Reading:

TERM WORK

7. Term work shall consist of at least four practicals and six assignments covering the topics of the syllabus.
8. A term work test shall be conducted with a weightage of 10 marks.

ORAL EXAMINATION

An oral examination shall be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING
FOURTH YEAR semester VII

SUBJECT: Elective - I, **Process Control Instrumentation**

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

Rationale:

DETAILED SYLLABUS

Introduction to Process Control, Feedback Control, Types of Processes, Performance Characteristics of measuring systems.

Measurement methods of different process parameters like pressure, force, torque, velocity, acceleration (Review).

Fluid flow measurement methods - Measurement of fluid density, viscosity, specific gravity, pH, humidity and liquid level.

Controllers - Modes of control like ON/OFF, proportional, derivative, integral, PD, PI & PID controllers. Selection of a proper control mode for a given process, Pneumatic control mechanisms, electronic controllers, Electronic and Pneumatic signal transmission.

Control valves like globe, pinch, butterfly ball valve etc., characteristics of valves, cavitation and flashing, selection of control valves for a process, valve sequencing. Introduction to PLC, PLC ladder logic, drawing of ladder diagrams, Programming of PLC.

Generalized data acquisition and data distribution systems, Multichannel DAS, Data Logger.

BOOKS

Text Books:

9. Anderson N.A., Instrumentation for Process Measurement and Control, third edition, Chilton Company, 1980.
10. Johnson C., Process Control Instrumentation Technology, fourth edition, Prentice Hall of India, 2001.

Additional Reading:

TERM WORK

11. Term work shall consist of at least 10 practicals and two assignments covering the topics of the syllabus.

12. A term work test shall be conducted with a weightage of 10 marks.

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING

FOURTH YEAR semester VII

SUBJECT: Elective - I, Wireless communication

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

***Rationale:** Rapid increase in the numbers of mobile subscribers and use of mobile networks for multimedia transmission has made wireless technology, the most rapidly evolving field in telecommunications. This subject teaches basics of wireless communication.*

DETAILED SYLLABUS

Introduction

Introduction to wireless communication systems.

The cellular concept

Frequency reuse, Hand - off strategies, Interference and system capacity, Tracking and grade of service, Improving coverage and capacity in cellular systems.

Mobile Radio propagation

Large scale path Loss: Reflection, Ground reflection (2 ray model), Diffraction, Scattering, Practical Link Budget - Design using path loss models.
Small scale fading and multipath: Small scale multipath propagation, Parameters of Mobile Multipath channels , Types of small scale fading , Rayleigh and Riceaw Distributions.
Diversity Techniques:

Wireless systems and standards

Analog Cellular systems: AMPS and ETACS - System overview , cell Handling, Air Interface,
N - AMPS Digital cellular system: GSM - Services and Features, system architecture, Radio subsystem channel types, frame structure, signal Processing, Typical call Flow sequences in GSM. CDMA Digital cellular standard - Frequency and channel specifications, forward CDMA channel, Reverse standard channel
Cordless Telephones: CT 2 , Standard , DECT, PACS (Personal access Communication system), PHS (Personal Handy phone system)

Mobile Data Communications:

Specialized packet and mobile Radio Networks, Circuit switched Data services on cellular Networks, Packet switched Data services on cellular Networks, Data over low power wireless and cordless Networks.

BOOKS

Text Books:

13. Theodore S Rappaport: Wireless Communication - Pearson Education, second edition.
14. Raj Pandya, Mobile and Personal Communication System and Services, Prentice Hall of India

Additional Reading:

15. David J. Goddman, Wireless Personal Communication Systems, Addison Wesley publication.
16. Joachim Tesal, GSM cellular Radio, John Wiley publication.

TERM WORK

17. Term work shall consist of at least eight practicals / assignments covering the topics of the syllabus.
18. A term work test shall be conducted with a weightage of 10 marks.

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.

B.E. ELECTRONICS ENGINEERING

FOURTH YEAR semester VII

SUBJECT: Elective - I, DSP Architectures & Systems

Lectures: 4 Hrs per week
Practical: 2 Hrs per week

Theory: 100 Marks
Term Work: 25 Marks
Oral: 25 Marks

***Rationale:** Digital Signal Processing has applications in many fields. The DSP algorithms are better implemented on DSP processors having specially tailored architectures. It is therefore essential for a DSP systems designer to understand these processors and apply them in system design.*

DETAILED SYLLABUS

Introduction to Programmable Digital Signal Processors
19. TMS 320C5X
Architecture
Assembly language instructions
Pipelining
Applications
20. TMS 320C54X
Architecture
Assembly language instructions
Pipelining
Applications
21. An Overview of TMS 320C6X
22. An Overview of Motorola DSP 563XX Processors

BOOKS

Text Books:

1. B. Venkataramani and Bhaskar, Digital Signal Processors: Architecture, Programming & Applications, Tata McGraw- Hill Publication, 2002.

Additional Reading:

1. A. Bateman & W Yates, Digital Signal Processing Design Wheeler Publication, 1988

TERM WORK

1. Term work shall consist of at least six practicals on actual DSP processors and two assignments covering the topics of the syllabus. 2. A term work test shall be conducted with a weightage of 10 marks.

ORAL EXAMINATION

An oral examination is to be conducted based on the above syllabus.