UNIVERSITY OF MUMBAI
SCHEME OF INSTRUCTION AND EVALUATION (R2007)
COURSE B.E. (ELECTRONICS ENGINEERING)

SEMESTER:VI

Sr. No.	Subjects	No.of periods of 1 Hour			Duration Of Theory Paper in Hours	Marks				Total
						Theory Paper	Term work	Practical /Oral	Oral	
1	Discrete Time Signal & System	4	2	--	3	100	25	--	25	150
2	Microprocessor and Microcontroller-2	4	2	-	3	100	25	25	--	150
3	Microwave Devices and Circuits	4	2	--	3	100	25	--	--	125
4	Electronics Instrumentation System	4	2	--	3	100	25	--	25	150
5	Power Electronics	4	2	--	3	100	25	25	--	150
6	Elective-1 •Communication Systems and Applications •Medical Electronics • Computer Organization	4	2	--	3	100	25	--	--	125
	Total	24	12	--	--	600	150	50	50	850

T.E. (ELECTRONICS) SEMESTER VI

Discrete Time Signal and System

Lectures: 4 hours / week	**Theory Paper: 3 hours and 100 marks**
Practicals: 2 hours / week	**Oral: 25 , Term work: 25, Total:150**

Objective : This second course in signals and systems aims to introduce the student to the idea of discrete time signal processing as a foundation course for subjects like image processing, speech processing, filter design, adaptive signal processing. It also covers introduction to DSP processors.

Prerequisite: Basic continuous signals and systems.

8 Hours

1.Discrete time (DT) signals & systems: Signal classification manipulations, signal periodicity in DT domain. Concept of system and system classification. System representation as a difference equation. Impulse response. Finite impulse response (FIR) & infinite impulse. Response (IIR) systems. Convolution and its properties, auto correlation and cross correlation and its properties. BIBO stability condition.

6 Hours

2.Z Transform: Two-sided Z transform and region of convergence (ROC). Properties of Z Transform and derivations. Relationship with laplace transform & mapping . One-sided Z transform. Inverse Z transform.

10 Hours

3.D.T.System analysis using Z Transform: System transfer function & impulse response, pole zero plot, BIBO stability and ROC. Solution of a difference equation: Zero input & zero state responses. Frequency response using analytical & graphical techniques. Pole zero plot and filter type for first and second order systems. System classification based on phase response as minimum phase, maximum phase, mixed phase or linear phase systems.

6 Hours

4.DT Signal Analysis & Computation of Spectra: DTFS definitions from orthogonal complex exponentials. CTFS & DTFS and properties of DTFS. Power density spectrum DTFT and properties of DTFT. Energy density spectrum. Relationship between DTFT & Z transform.

10 Hours

5.Discrete Fourier Transform (DFT): DFT and comparison with other transforms. DFT properties. Circular convolution. Block convolution using DFT by Overlap-add and overlap save methods. Fast fourier transform (FFT) by radix 2 and radix 3 and radix 4 techniques. Decimation in time. Decimation in frequency with development of flow graphs. DFT analysis of sinusoidal signals. Goertzel algorithm. Comparison of complex and real, multiplication and additions of DFT and FFT. DFT computation by divide and conquer approach limitation of DFT. Applications of FFT.

DSP processors and application of DSP: Need for special architecture of DSP processor. Difference between DSP processor & microprocessor. Fixed point and floating point processors. A general DSP processor (TMS320C54XX series). TMS6713, and Da - vinci. Application of DSP to speech, image, biomedical and radar processing.

Text books: Ashok Ambardar, Digital Signal Processing, Cengeg Learning Publication. J.G.Proakis, D.G.Manolakis, digital signal processing: Principles, Algorithms and applications, Prentice Hall of India, 1995. A.V.Oppentheim, Ronald W.Schater, Prentice Hall, 1983. E.C.Ifeachor and B.W.Jervis, digital signal processing a practical approach, Pearson publication. B Venkata Ramani and M.Bhaskar, Digital signal processors, architecture programming and TMH 2004.

Term work:
The term work shall consist of at least two numerical assignments and eight MATLAB/C or lab view simulations covering the whole of syllabus, duly recorded and graded. This will carry a weightage of fifteen marks. A test shall be conducted and will carry a weightage ten marks. Laboratory work-15 marks. Test – 10 marks.

T.E. (ELECTRONICS) SEMESTER VI

Microprocessors & Microcontrollers-II

Lectures: 4 hours / week	**Theory Paper: 3 hours and 100 marks**
Practicals: 2 hours / week	**Practical Exam 3 hours and 25 marks** **Term work: 25 marks Total:150**

Objective : The objective of this course is to introduce to the students 16 bit Microprocessors & Microcontrollers.

Pre-requisite: Concept of 8 bit Microprocessor and Microcontroller.

Hours 15

1.8086 and 8088 Microprocessors: Architecture and organization of 8086/8088 microprocessors family, bus interface unit, 8086/8088 hardware pin signals, timing diagram of 8086 family microprocessors, simplified read/ write bus cycles, 3086 minimum and maximum modes of operation, 8086/8088 memory addressing, address decoding, memory system design of 8086 family, timing considerations for memory interfacing, input/output port addressing and decoding, introduction to 8087 floating point coprocessor and its connection to host 8086.

Hours 10

2.8086 assembly language programming: Addressing modes, 8086 instruction formats and instruction set, data transfer, arithmetic, bit manipulation, string, program execution transfer and program control instructions, machine codes of 8086 instructions, assemble language syntax. Assembler directives, initialization instructions, simple sequential and looping programs in assemble language, debugging assembly language programs.

Hours 8

3.Programmable Interface and peripheral devices: Interfacing of 8155, 8255 and 8259 with 8086 and study and interfacing of 8257 DMA controller with 8086. Comparative study of salient feature of 8086, 80196, 80296, 80386, 80486 and Pentium.

Hours8

4.PIC Controllers: PIC 18 memory organization. CPU registers. Pipelining. Instruction format. Addressing modes. Sample of PIC 18 instructions. Overview of the 8-bit MCU market.

Hours8

5.PIC 18 assembly language programming: Assembly language programme structure. Assembler directives. Writing programmes to perform arithmetic computations. Programme loops. Reading and writing data in programme memory. Logic instructions. Using programme loop to create time delays. Rotate instructions. Using rotate instructions to perform multiplications & divisions.

Hours7

6.Parallel Ports: I/O addressing. Synchronization. Overview of the PIC 18 parallel ports. Interfacing with simple outpur devices.

Suggested Practical list

8085 Based (Max 02)

01) Addition and subtraction of two 8-bit numbers with programs based on different addressing modes of 8085A.
02) Addition and subtraction of two 16-bit numbers. (Using 2's complement method, also programs which access numbers from specified memory locations.)
03) Addition and subtraction of two 16-bit BCD numbers. (Using DAA instruction.)
04) Multiplication of two 8-bit numbers using the method of successive addition and Shift & add.
05) Division of two 8-bit numbers using the method of successive subtraction and shift & subtract.
06) Block transfer and block exchange of data bytes.
07) Finding the smallest and largest element in a block of data.
08) Arranging the elements of a block of data in ascending and descending order.
09) Converting 2 digit numbers to their equivalents.
a) BCD to HEX and b) HEX to BCD
10) Generating delays of different time intervals using delay subroutines and measurement of delay period on CRO using SOD pin of 8085A.
11) Generation of Fibonacci Series.

Application Based (Max 2)

01) Program controlled data transfer using 8255 PPI.
A) To INPUT data bytes from peripheral port and to store them in memory.
B) To OUTPUT data bytes from memory to peripheral port.
02) Study of interrupts by enabling them in main line program and then executing different subroutines when TRAP, RST 7.5, RST 6.5 & RST 5.5 are activated.
03) Interfacing 7 segment LED display using 8255A – in static and dynamic mode.
04) Interfacing ADC 0808/0809.
05) Interfacing DAC 0808.
06) Interfacing stepper motor with microprocessor using 8255A – in Half and Full excitation.
07) Interfacing a Centronics type printer.
08) Interfacing of Thumbwheel switches.
09) Interfacing of 8253 / 8254.

8051 experiments (Max 2)

1.Arithmetic operations
2.Packing and unpacking
3.Ascending and descending
4.8051 timer based experiment
5.Transmission of character using RS 232 to PC(preferably on bread board)
6.16 * 2 LCD and Hex keyboard interface (preferably on bread board)
7.ADC or DA C interface (any application) (preferably on bread board)

On latest: Students can be perform on Proteus VSM Plateform (Min 4)

To design and test circuits on

1.LED blinking,
2.7segments display,
3.16x2 multiple character LCD,
4.Run stepper motor/ DC motor,
5.Implement square wave,
6.Temperature display using
7.Demonstration of traffic lights,
8.Speed control of motor,

Using ARM Processor.

Note: The above list of experiment can be done by using Proteus Vsm software

Practical/ Oral Examination:

Practical Examination will be based on experiments performed from the list of experiment given in the syllabus and the evaluation based on the same experiment.

Oral will be based on any experiment performed from the list of experiment given in the syllabus and the entire syllabus.

Term work:

Term work shall consist of minimum ten experiments and a written test.

The distribution of marks for term work shall be as follows:

Laboratory work (Experiments and Journal) : 10 marks.
Test (at least one) : 10 marks.
Attendance (Practical and Theory) : 05 marks.

The final certification and acceptance of term-work ensures the satisfactory performance of laboratory work and minimum passing in the term-work.

Theory Examination:

1.Question paper will be comprise of total 7 questions, each of 20 marks.
2.Only 5 questions need to be solved.
3.Question number 1 will be compulsory and will cover all modules.
4.Remaining questions will be from same module or mixed in nature. (e.g.- suppose Q.2 has part (a) from, module 3 then part (b) will be from any module other than module 3.)
5.In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.
6.No question should be asked from pre-requisite module.

Recommeded Books:

1.Microprocessors and interfacing, Douglas v shall, Tata Mc Gram Hill.
2.Han Way Huang, PIC Microcontroller, Cengage Learning.
3.Design with PIC microcontrollers by John B. Peatman, pearson education Asia LPE.
4.The 8086/8088 family, john uffenbuck, pearson media, LPE
5.DV Kodavade, S Narvadkar, 8085-86 microprocessors architecture progg and interfaces, wiley.
6.Ajay deshmukh, microcontroller, TMH.
7.Smith, programming. The pic microcontroller with mbasic(CD), Elsevier.
8.Gaonkar ramesh, fundamentals of microcontrollers and applications in embedded systems, penram international publishing.
9.Martin Bates, PIC microcontrollers, 2e, Elsevier.

T.E. (ELECTRONICS) SEMESTER VI

Microwave Devices and Circuits

Lectures: 4 hours / week	**Theory Paper: 3 hours and 100 marks**
Practicals: 2 hours / week	**Termwork: 25 marks Total:125**

Objective : With ever-increasing need for radio-frequency spectrum space microwave communication and optical communication have growth rapidly. At shorter wavelengths the conventional low frequency circuit analysis no longer holds good and hence knowledge of electromagnetic field theory is required for an adequate description of the electrical phenomenon. An understanding of the microwave principles and working of microwave devices is presented in this course.

Knowledge of basic engineering electric magnetics.

1. Introduction to microwave communications: Microwave spectrum and bands, limitations of conventional circuit theory concepts at microwave frequencies. Applications of Microwaves.

2.Generation and amplification of microwaves: Limitations of conventional vacuum tubes at microwave frequencies. Two cavity klystron amplifiers and reflex klystron oscillators: constructions, process of velocity modulation and bunching, applegate diagram, o/p power and efficiency, applications. Cyclindrical magnetron: construction and working principle. Hull cut off magnetic equation and hull cut off voltage equation, cyclotron angular frequency, applications. Traveling wave tube: Construction and working principle, applications. Numerical examples based on the above topics.

3.Wave guides: Rectangular and circular wave guides, solution of maxwell's equation for distribution of fields in the waveguides, characteristic equation, dominant and degenerate modes, group and phase velocities cut off frequency. Numerical examples based on the above topics.

4.Wave guide components and analysis: Definition and significance of s-parameters, properties of s-parameters. Construction working principle and s-matrix representation of the following microwave components. Cavity resonators waveguide attenuators, waveguide phase shifters, waveguide multiport junctions, E plane and H plane tee, magic tee, hybrid ring, directional couplers. Microwave ferrite components faraday rotation isolator, gyrator, circulator. Numerical examples based on the above topics.

5.Microwave solid state devices: Principle of operation and characteristics of gunn diode, TRAPATT and IMPATT diodes, microwave transistors, introduction to strip lines.

6.Microwave measurement: Measurement of power attenuation, frequency, VSWR, cavity Q and impedance.

Text books:

1. Microwave devices and circuits, Samuel y.liao. phi
2. Microwave circuits and passive devices, M.L.sisodia, G.S.Raghuvanshi. New Age international (p) ltd.
3. Microwave Engineering Annapurna Sas. Tata Mcgraw Hil.

Term work:

Term work shall consist of minimum eight experiments. Two assignments and a written test. Laboratory work-15 marks. Test-10 marks.

T.E. (ELECTRONICS) SEMESTER VI
Electronics Instrumentation Systems

Lectures: 4 hours / week	**Theory Paper: 3 hours and 100 marks**
Practicals: 2 hours / week	**Term work: 25 marks, Oral: 25marks Total:150**

Objective: An undergraduate course on instrumentation systems in some form is regarded as an essential element of study for all electronic engineering students. A balance must be drawn between the diversity of sensors that are presented and the diversity of electronic signal processing techniques included so that a strong link with other courses is maintained.

Pre-requisite: System of units, measuring instruments, measurement of inductance and capacitance AC bridges.

1.Instrumentation System: Basic characteristics of instruments static and dynamic. Classification of instruments. Response for standard inputs: Unit step Ramp and sinusoidal signals. Performance characteristics and error analysis of measuring system.

2.Transducers: Requirement of Transducers: Classification of transducers. Advantages of electrical transducer. Transducer used for measurement of different physical parameters such as: displacement. Strain, temperature, pressure, flow speeds accelerators, vibration weight, level, sound force and torque. Sensors used in analytical measurement of PH. Viscosity, humidity and dew point.

3.Signal Generation and Conditioning system: Various signal generators and its implementation. Active and passive filters. Filter design for different applications. Switch capacitor filter. Logarithmic amplifier. Instrumentation amplifier with programmable gain. Window comparator. Input-output protection circuit. Frequency to voltage and voltage to frequency converters. Current to voltage and voltage to current converters. Data converters.

4.Data Acquisition System and Advances in Instrumentation Systems: Single channel data acquisition. Multi-channel data acquisition systems. Monitoring instruments: Indicators, alarm, recorders. Data logger, PC-based instrumentation system. HMI, SCADA. Virtual instrumentation: concept and applications. Distributed control system(DCS).

5.Controllers: Manipulations devices. The control valves, valve characteristics. Solenoid. Servomechanism and DC and AC Motor. Continuous and discontinuous controller. Proportional controller. Proportional band. RESET controller. Rate controller. Composite controller. Cascade controller. Feed-forward controller.

6.Calibration of instruments and controller tuning: Need of instrument calibration. Preparation for calibration. Standard calibration procedure. Five point calibration procedure. Controller tuning: need and different method of controller tuning.

Text Books:

1. Instrumentation Devices and Systems. By C.S.Rangan. G.R.Sarma. V.S.Mani
2. 2.Process Control System and Instrumentation. By Terry Barlett DELIMAR CEMGAGE learning Reprint – 2008.

Term work:

The term work shall consist of at least eight laboratory experiments covering the whole of syllabus, duly recorded and graded. The guidelines for carrying out the experiments is as given below. Distribution of marks 15 marks. Laboratory work 10 marks.

T.E. (ELECTRONICS) SEMESTER VI

Power Electronics

Lectures: 4 hours / week	**Theory Paper: 3 hours and 100 marks**
Practicals: 2 hours / week	**Term work: 25 marks, Oral/Practical: 3hrs. 25marks Total:150**

Objective: To teach the basic concepts of power electronics. Also to study the important power devices in detail along with basic application of SCR as controlled rectifier. To get skill of developing and design related to power electronics circuits.

Pre-requisite: Concept of semiconductor, rectification, behavior of inductor, capacitor harmonics. Fourier analysis.

1.Semiconductor power devices: Characteristics of power diodes, power transistors, power MOSFET, IGBT, SCRs, DIAC and GTO. Rating of power devices, series and parallel connections of SCRs.

2.SCR protections : dv/dt, di/dt, over voltage and over current protection, cooling of semiconductor devices. Isolation circuits using optocoupler and transformer.

3.Turn on and turn off circuits: Turn on methods-study of single phase firing circuits using UJT, ramp and pedestal, cosine inverse, microprocessor/ microcontroller based turn OFF methods- forced commutation circuits parallel capacitance, resonant turn off, external pulse commutation, auxiliary thyristors and load commutation.(class A to F)

4.Applications of Thyristors: Static circuit breakers, over voltage protectors, zero voltage switch, integral cycle triggering, time delay method, soft start method.

5.Controlled Rectifier Circuits: Single phase- Half wave full wave, half controlled and full controlled converters with R & RL load, effect of freewheeling diode. Calculations of performance parameters expected.

6.Controlled Rectifier Circuits: Three phase- Half wave, full wave, fully controlled converters with resistive load only.

Text books:

1. General Electric: SCR manual, USA
2. Ned Mohan: Power electronics, John Willey Pub
3. M.H.Rashid, power electronics, PHI India.
4. M.D.Singh and K.B.Khanchandani, power electronics, Tata McGraw Hill
5. P.C.Sen, Power Electronics, TMH.
6. Dr.P.S.Bimbhra, power electronics, khanna publications.

Term work:

Term work shall consist of minimum eight experiments. Two assignments and a written test. Laboratory work – 15 marks, Test (at least one) 10 marks.

T.E. (ELECTRONICS) SEMESTER VI

Communication Systems and Application (Elective-1)

Lectures: 4 hours / week	**Theory Paper: 3 hours and 100 marks**
Practicals: 2 hours / week	**Termwork: 25 marks, Total:125**

Objective: This course acquaints the students with antenna fundamentals and continues with a consideration of overview of different communication systems. This study emphasizes the requirements and standards of a quality television systems, both monochrome and color TV. Wide usage of satellite communication and optical fiber communication around us focus is also on RADAR. Its fundamentals and performance factors, that gave birth to microwave technology in later years.

Pre-requisite: Concepts of basic communication techniques, characteristics of guided and unguided media.

1. Antennas: The half wave dipole, antenna characteristics, effects of ground on antennas, effects of antenna height, antenna coupling, antenna arrays: directional HF Antennas, UHF and microwave antennas.

2.Television principles: Television system and standards. The composite video signal, blanking and synchronizing pulses, video modulation and VSB signal.

3.Color TV: Color TV transmission, color reception, PAL-B standard color TV transmitter and receover (block diagram only), features of cable TV, digital TV, HDTV, LCD and plasma TV.

4.Satellite Communication : Kepler's Laws, satellite orbits, spacing and frequency allocation, look angles, satellite system link models, multiple access: FDMA, TDMA, Direct broadcast satellite services. Applications of LEO, MEO and Geo-stationary satellites.

5.Radar systems: Basic principles, radar performance factors, antenna scanning and tracking. MTI and pulsed Doppler radar, continuous wave Doppler radar, FM-CW radar.

6.Optical communication system : Key elements of optical fiber communication link, fiber configurations and classifications losses in fiber cables, optical sources, optical detectors.

Text books:

1.Kennedy Davis-Electronic Communication Systems, Tata Mcgraw Hill, Fourthed 1999.
2.Wayne Tomasi-Advanced Electronic Communication Systems, PHI, Sixthed 2004.
3.Gulati-Monochrome and color television, New Age International (P) Ltd.
4.Roy Blake-Electronic Communication Systems, Thomson Learning, 2nd 2002.
5.AM Dhake-Television & Video Engineering, Tata Mcgraw Hill, 2nd Ed2002.

Reference Books:

1.Jordan Balmian- Electromagnetic waves and Radiating systems, PHL, 2nd Ed., 1988.
2.Merrill skolnik-introduction to rader system., Tata Mcgraw Hill, Third edition, 2001.
3.Micchoel o kolawole- Radar system peak detection & tracking Elsevier.
4.Dennis Roddy-Satellite Communication, Mcgraw Hill, third ed, 2001.
5.Prall Bostian-Satellite Communication, John Wiley and Sons, 1986.
6.Gerd Keiser-Optical Fiber Communications, Tata Mcgraw Hill, Fourthed 2008.

Term work:

Term work shall consist of minimum eight experiments and student presentation (not more than two student per group)on communication application and a written test. Laboratory work – 15 marks, Test (at least one) 10 marks.

T.E. (ELECTRONICS) SEMESTER VI

Medical Electronics(Elective-1)

Lectures: 4 hours / week	**Theory Paper: 4 hours and 100 marks**
Practicals: 2 hours / week	**Termwork: 25 marks, Total:125**

Objective : To Understand generation of electrical signal after studying anatomy and physiology of human body and different systems. Picking of signal and use of different instruments under different category such as diagnostic, intensive care. Therapeutic equipment and imaging units. To know safely measures in biomedical equipments, recording electrodes and recording systems used introduce concept of telemetry and hospital management system.

Pre-requisite: Knowledge of basic requirements of a good instrument and human body and different life processes.

1.Sources of Bio-Electric Potential: Man-instrument system requirements difficulties and types. Basics of generation of action potential. Recording electrodes. Electrode-electrolyte interface. Physiological Transducers.

2.Bio-potential Amplifiers and Signal Conditioner and Recording Systems: Electrocardiogram, Electroencephalogram, Electro-myogram, Electronic spirometer, Electrooculogram, Electroetinogram.

3. Diagnestic Equipments: Electrocardiograph(ECG), Electroencephalograph(EEG), Electromyograph, Pulse oximeter, Measurement of blood pressure, blood flow and cardiac output. Impedance plethysmography, Measurements in the respiratory system.

4.Therapeutic and prosthetic equipment: Defibrillators, Pacemakers, ventilators, bedside monitor, audiometer, Hemodialysis, infant incubators, muscle and nerve stimulators, Electrocautery machine, short wave diathermy, ultrascund therapy unit.

5. Imaging equipment: Computed tomoyraphy, Magnetic resonance imaging, Ultrasonic imaging system, Positron emission tomography.

6. Safely and Telemetry in Biomedical Instrumentation: Causes of electrical shock micro & macro shock. Electrical safely codes and standards. Methods of accident preventions. Test of grounding system in patient care area, chassis leakage current. Biomedical telemetry. Hospital management system.

Text books:

1.Webster J. G. medical instrumentation- application and design, wiley and sonsinc., third edition, 1999.
2.Khandpur R.S.Handbook of biomedical instrumentation, Tata Mcgraw Hill second edition, 2003.

Term work:
The term-work shall consist of at least six laboratory experiments covering the whole of syllabus, duly recorded and graded. The experiments can performed with the help of lab VIEW S/W as mentioned in the list. This will carry a weightage of ten marks. A test shall be conducted and will carry a weightage of ten marks.
Laboratory work – 15 marks
Test-10 marks.

T.E. (ELECTRONICS) SEMESTER VI

Communication Organization

Lectures: 4 hours / week	**Theory Paper: 3 hours and 100 marks**
Practicals: 2 hours / week	**Termwork: 25 marks, Total:125**

Objective: The subject of Computer Organization shall lay a strong fundamental base in understanding the functional and design aspects of various units of digital computer. The emphasis shall be on understanding of Hardware issues in computer design while addressing a number of software issues to instruction execution, storage allocation etc.

Prerequisite: Fundamentals of microprocessor architecture, memory interfacing.

8 Hours

1.Basic Processing Unit- CPU Organization. Some fundamentals like register transfer, fetching and storing a word from memory. Execution of an instruction including branch. The data path design. Fixed Point Arithmetic- Addition, fast addition, multiplication, division algorithms.

8 Hour

2. Control Unit-Hardwired control design example of multiplier/ divisor. Micro programmed control: design examples. Performance enhancement using pipelining: Introduction, data hazards, instruction hazards, super scalar architecture.

8 Hours

3.Memory Organization- Memory system: multiple level memories, concept of cache and virtual memory, address translation, segmentation, paging, TLB, memory allocation, replacement policies. Cache system: Cache architectures- look though and look aside. Cache organizations: direct and associative mapping. Replacement algorithms, hit ratio, performance of cache memory.

8 Hours

4.Input/output organization- I/o devices types and access methods. Interrupts and DMA. Types of busses and bus arbitration, synchronous and asynchronous bus. I/o interface – serial and parallel ports. Storage devices- organization, access techniques of magnetic hard disks and optical disks.

8 Hours

5.Introduction to intel IA32 architecture- Intel IA32 architecture: pipelined. Register structure, addressing modes. Advancements in arithmetic and logical instructions. Exception handling in IA32 architecture.

8 Hours

6.Introduction to ARM- Te ARM family architecture (RISC). Register structure. Memory access and addressing modes. Arithmetic and logical instructions. Branching instructions.

Suggested Books:

1.Hamacher, vranesic, zaky: Computer organization, Tata Mcgraw hill, fifth edition.
2.John P. Hayes: Computer Architecture and Organization, Tata Mcgraw Hill.
3.Hennessy and Patterson: Computer Organization and design, Morgan.

Term work:
Term work shall consist of minimum eight experiments and student presentation (not more than two student per group)on communication application and a written test. Laboratory work – 15 marks, Test (at least one) 10 marks.