**PROGRAMME : B.Sc., E & C**      **COURSE CODE   : 3EC1(2008 On)**
**COURSE TITLE : LINEAR INTEGRATED**      **QN.NO         : 4312**
**CIRCUITS**
**TIME  : 3 Hours**      **MAX.MARKS :75**

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**Unit I : Operational Amplifier:**
Functional block diagram – Symbol – Characteristics of an ideal OpAmp – Circuit Schematic of IC 741 – CMRR – Input Bias current – input offset current – input offset voltage – total output offset voltage – thermal drift – Frequency response – stability – frequency compensation – slew rate.

**Unit II : Linear Applications of OpAmp:**
Inverting and Non-Inverting amplifiers – Voltage follower – Summing Amplifier – Differential amplifier – differential amplifier – instrumentation amplifier – differentiator – integrator – voltage to current converter – current to voltage converter – sinusoidal oscillators – design of low pass, high pass, wide band pass and band stop butterworth active filters – narrow band-pass & notch active filter.

**Unit III : Non-linear applications of Op-Amp:**
Comparators – regenerative comparator – zero crossing detector – sample and hold circuit – half-wave rectifier – full wave rectifier – peak detector – clipper – clamper – log and antilog amplifier.

**Unit IV : Function generator and Voltage regulator:**
Square wave and triangular wave generator – IC voltage regulator – 723 general purpose regulator.

**Unit V : Special Function ICs:**
IC 555 timer : Introduction, Functional block diagram, monostable operation and applications, astable operation and applications, Schmitt trigger – Voltage Controlled Oscillator (VCO).

**Books for Study :**
1. Linear Integrated Circuits – D.Roy Choudhury and Shail Jain – New Age International (P) Ltd – 2001

**Unit 1** : Sections 2.4, 2.2, 2.3, 2.5.2, 2.3.7, 3.2.1, 3.2.2, 3.2.3, 3.2.4, 3.2.5, 3.3.1, 3.3.2, 3.3.3, 3.3.4
**Unit 2** : Sections 2.3.3, 2.3.4, 2.3.5, 4.2, 4.3, 4.10, 4.11, 4.5, 5.7, 7.2
**Unit 3** : Sections 5.2, 5.3, 4.7, 4.6.1, 4.6.2, 4.6.3, 4.6.4, 4.6.6, 4.8
**Unit 4** : Sections 5.4, 5.6, 6.3, 6.4
**Unit 5** : Sections 8.1 to 8.5, 9.4

**Books for Reference :**

2. OpAmps and Linear Integrated Circuits – Ramakant A. Gayakwad – PHI (P) Ltd – Third Edition (1999 reprint)
3. Operational Amplifiers and Linear Integrated Circuits – Robert F. Coughlin & Frederick F. Driscoll – PHI (P) Ltd – Sixth Edition (2008 reprint)

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**PROGRAMME : B.Sc., E & C**          **COURSE CODE   : 3EC2(2008 On)**
**COURSE TITLE : PROGRAMMING IN  C++**          **QN.NO          : 4314**
**TIME  : 3 Hours**          **MAX.MARKS :75**

**Unit I :**

Identifiers and keywords – Constants – Operators – type conversion – declaration – statements – simple C++ programs – keyboard and screen I/O – control statements – if – switch – for – while – do…while.

**Unit II :**

Functions – definition – return – types of functions – actual and formal arguments – local and global variables – array – notation – declaration – initialization – processing with arrays – arrays and functions – multi-dimensional arrays – pointer declaration – pointer arithmetic – call by value – call by reference.

**Unit III :**

Classes – Objects – declaration – member function – defining the object of a class – accessing a member of a class – array of class objects – classes within classes – constructors – destructors – static class members – friend functions – this pointer.

**Unit IV :**

Inheritance – Single inheritance – direct and indirect base classes – types of derivation – ambiguity in single inheritance – arrays of class objects and single inheritance – multiple inheritance – Member access control.

**Unit V :**

Function Overloading – Overloading assignment operator – Overloading of binary operators – overloading of unary operators – polymorphism – early binding – virtual functions – pure virtual functions – late binding – abstract base classes.

**Books for Study :**
   1. Programming with C++ - D Ravichandran – Tata Mc Graw Hill Publishing Co Ltd. – Second Edition (2004 reprint)
Unit 1 : Sections 1.1 to 1.5, 2.1 to 2.4, 3.1 to 3.4
Unit 2 : Sections 4.1 to 4.6, 5.1 to 5.7, 6.1 to 6.3.2
Unit 3 : Sections 8.1 to 8.7, 8.10, 9.1, 9.2, 9.4, 9.5, 9.7
Unit 4 : Sections 10.1 to 10.7, 10.9
Unit 5 : Sections 11.1 to 11.4, 12.1 to 12.7

**Books for Reference :**

   2. Object Oriented Programming with C++ - E. Balagurusamy – Tata Mc Graw Hill Publishing Co Ltd. – Second Edition (2001 reprint)
   3. Object Oriented Programming in Turbo C++ - Robert Lafore – Galgtia Publications – 1998 reprint.

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| **PROGRAMME : B.Sc., E & C** | **COURSE CODE : 3SEC (2008 on)** |
| **COURSE TITLE : ELECTRONICS EQUIPMENTS** | **QN.NO : 4316** |
| **& SERVICING** | |
| **TIME : 3 Hours** | **MAX.MARKS :75** |

**Unit I : Alignment and Servicing Equipment**

Multimeter – Vacuum Tube Voltmeter (VTVM) – Digital multimeters – Cathode Ray Oscilloscope – Video Pattern Generator – Sweep generator – Marker generator – the colour bar generator – vectroscope – high voltage probe.

**Unit II : Receiver Circuits and Alignment**

Monochrome TV receiver circuit – Monochrome receiver alignment – Television test charts – All IC television receivers – Alignment of colour receivers.

**Unit III : Receiver Servicing**

Trouble shooting procedure – troubleshooting monochrome receivers – servicing of various functional blocks – troubleshooting colour receivers – servicing circuit modules – safety precautions in television servicing.

**Unit IV : VCR and Servicing**

Video recording requirements – Tape recording and playback – VCR Servicing.

**Unit V : Video Camera and Servicing**

Basic operation of a TV camera – Types of camera tubes – Servicing video cameras.

**Books for Study :**
   1. Monochrome and Colour Television – R R Gulati – Wiley Eastern Edition – 1994 reprint.
[Sections 28.1 to 28.10, 29.1 to 29.5, 30.1 to 30.6]

   2. Basic Television and Video Systems – Bernard Grob – McGraw Hill International Edition – Fifth Edition (1984).
[Sections 10.1, 10.2, 16.11, 3.1, 3.2, 16.12]

**Books for Reference:**
   3. Radio Engineering – G.K.Mithal – Khanna Publishers – 20th Edition (2000).

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PROGRAMME : B.Sc., E & C     COURSE CODE   : 4EC1 (2008 ON)

COURSE TITLE : ANALOG COMMUNICATION     QN.NO          : 4318
                                 SYSTEMS

TIME  : 3 Hours          MAX.MARKS :75

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### Unit I : Mathematical Foundation of Communication

Random Process – Mathematical definition of a random process – stationary process – mean, correlation and covariance functions – ergodic processes – transmission of a random process through a linear time-invariant filter – power spectral density – Gaussian process.

### Unit II : Amplitude Modulation

Amplitude modulation – linear modulating schemes – DSB-SC modulation – Coherent detection – Costas receiver – Quadrature carrier multiplexing – SSB modulation – Vestigial Side Band modulation – Television Signals – AM transmitters – AM receivers.

### Unit III : Angle Modulation

Angle modulation – frequency modulation – Narrow band FM – Wide band FM – Transmission bandwidth of FM signals – Generation and demodulation of FM signals – FM stereo multiplexing – Non-linear effects in FM systems – Super heterodyne receiver.

### Unit IV : Pulse Analog Modulation

Sampling process – Sampling theorem – Pulse Amplitude Modulation – Pulse Frequency Modulation – Pulse Time Modulation – Pulse Position Modulation – Pulse Width Modulation.

### Unit V : Noise in CW modulation

Noise – Narrowband noise – Noise in CW modulation systems – Noise in linear receivers using coherent detection – Noise in AM receivers using envelope detection – Noise in FM reception – Threshold effect – pre-emphasis and de-emphasis.

### Books for Study :

1. Communication Systems – Simon Haykin – Wiley India Edition – 4th Edition (2007 reprint)

[Sections 1.1 to 1.8, 2.1 to 2.3, 2.6 to 2.9, Sections 3.1, 3.2, 1.9, 1.10, 2.10 to 2.13]

2. Electronic Communications – Dennis Roddy & John Coolen – PHI (P) Ltd. – 4th Edition (1995)

[Sections 8.12, 8.13, 11.2, 11.4 to 11.7]

### Books for Reference :

3. Communication Systems – B.P.Lathi – Wiley Eastern University Edition – 1994 reprint.
4. Modern Digital and Analog Communication Systems – B.P.Lathi – Prism Books P. Ltd. – 2nd Edition (1993).

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PROGRAMME : B.Sc., E & C                COURSE CODE   : 4EC2 (2008 ON)

COURSE TITLE : SENSORS AND TRANSDUCERS      QN.NO          : 4320

TIME  : 3 Hours                          MAX.MARKS :75

## Unit 1:  Basic concepts of measurements
Introduction-System configuration –Basic characteristics of measuring devices –Calibration- Electrical transducer-Classification-Basic requirements of a transducer- Dynamic characteristics of a measurements system, Transfer function representation, zeroth order, first order, second order system- Specifications and testing of dynamic response.

## Unit 2: Displacement measurement
Principles of transduction- Digital transducer level measurements.
Strain  measurement: Factors affecting strain measurements- Types of Strain gauges – Theory of operation of resistance Strain gauges- Types of electrical Strain gauges – Bonded and Unbonded Strain gauge – Foil Strain gauge – Gauging techniques and other factors- Strain gauge circuits –Temperature compensation – Applications.

## Unit 3 : Vibration measurement
Characteristics of vibration- Analysis of vibration sensing devices - Vibration sensing devices – Velocity transducer  - Bonded strain gauge accelerometer – Digital accelerometer - Signal conditioners – Shock measurements – Vibration Exciters – Calibration. **Pressure measurements:** Diaphragms – Other elastic elements – Transduction methods – Solid state devices – Piezo electric pressure transducer – Vibrating element pressure sensors, pressure calibration.

## Unit 4:  Flow measurement
Classification of Flow meters   –   Head type of flow meters – Orifice meters   -  Venturi  tube – Flow nozzles -   Rotameters – Electromagnetic flow meters – Mechanical flow meters – Positive displacement meter  – Anemometers  -  Hot wire anemometers  – Ultrasonic flow meters – Vortex flow meters – Mass Flow measurements. **Temperature measurement:** Mechanical temperature sensor –  Platinum resistance thermometer- Resistance type temperature sensors -  Thermistor – Thermocouples – Solid state sensors .

## Unit5: General purpose electronic test equipment
CRO- Digital voltmeters and multimeters - Electronic counters – AC millivoltmeters – Wave analysers and Spectrum analysers- Signal generators – Lock in amplifier.

**Books for Study:**
1. Instrumentation Devices and Systems - C.S.RANGAN, G.R.SARMA AND V.S.V.MANI
Tata  McGraw Hill Publishing Company Limited. Second Edition 2000
Unit 1:   1.1, 1.2, 1.4, 1.5, 2.1 to 2.4, 3.1 to 3.5, 3.7
Unit 2:   4.1 to 4.4, 5.1 to 5.5, 5.5.1 to 5.5.3, 5.7 to 5.10
Unit 3:   6.1 to 6.4, 6.4.1, 6.4.2, 6.4.5, 6.5, 6.6, 6.8, 6.9, 7.1 to 7.4, 7.6, 7.8, 7.9, 7.11
Unit 4:   8.1 to 8.3,  8.3.1 to 8.3.3, 8.4 to 8.6, 8.6.1, 8.7, 8.7.2, 8.8, 8.9, 8.11, 9.1,
          9.3 to 9.8
Unit 5:  19.1 to 19.7, 19.9.

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**PROGRAMME : B.Sc., E & C**  **COURSE CODE : 4SEC (2008 ON)**
**COURSE TITLE : MICROSOFT OFFICE**  **QN.NO : 4328**
**TIME : 3 Hours**  **MAX.MARKS :75**

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**Unit I :**
Introduction to MS Office – Starting Word – Creating documents – Parts of a Word Window – Mouse Operations – Designing a document – Formatting features – Block operations – Toolbars : Standard, formatting, border, drawing – fonts – aligning – underlining – numbering – bullets – print – save – Opening and Closing a document – exiting Word.

**Unit – II :**
Excel – Navigating – selecting cells – entering and editing text, entering numbers and formulae – entering dates – alignment – Toolbars : Standard, formatting, drawing – Series fill – copying and pasting formula – print – save – open – currency and other operations.

**Unit III :**
Data Sort – ROUND() – SQRT() – AVERAGE() – MAX() – MIN() – COUNT() – SUM() – IF() – SUMIF() – ABS() – ROMAN() – UPPER() – LOWER() – CELL() – TODAY() – NOW().

**Unit IV :**
Parts of a Powerpoint window – Powerpoint standard toolbar, formatting toolbar, drawing toolbar, drawing+ toolbar – autoshapes toolbar – moving the frame and inserting clipart – table – design template – saving the presentation – autocontent wizard – templates.

**Unit V :**
Frontpage – screen layout – views – web wizard – template – general properties – themes – text – hyper link – tables – graphics and pictures – web design tips.

**Books for Study :**
1. A First Course in Computers – Sanjay Saxena – Vikas Publishing House (P) Ltd. – 1998.
Unit 1 : Part – 3, Part – 4 (Unit – I)
Unit 2 : Part – 5 (Unit – I)
Unit 3 : Part – 5 (Unit – II & III)
Unit 4 : Part – 6
Unit 5 : http://www.fgcu.edu/Support/office2000/frontpage/index-beginner.html

**Books for Reference :**
2. PC Software for Windows 98 Made Simple – R.K.Taxali – Tata Mc Graw Hill Publishing Co. Ltd. – 2008 reprint.

PROGRAMME : B.Sc., E & C      COURSE CODE : 5EC1 (2008 on)

COURSE TITLE : DIGITAL COMMUNICATION    QN.NO : 4330
                     SYSTEMS

TIME : 3 Hours                         MAX.MARKS :75

## Unit I : Introduction

Model of a communication system – Elements of a digital communication system – Analysis and design of a communication system – Systems and Signals – Spectral analysis of modulation and demodulation – spectrum analyzer.

## Unit II : Baseband Data Transmission

Baseband binary PAM systems – Baseband pulse shaping – Optimum transmitting and receiving filters – duobinary baseband PAM system – M-ary signaling schemes – Pulse shaping by digital methods – Equalization – Synchronization – Scrambler and Unscrambler.

## Unit III : Digital Carrier Modulation Schemes

Introduction – Optimum receiver for Binary digital modulation schemes – Binary ASK signaling schemes – Binary PSK Signaling Schemes – Binary FSK Signaling schemes – M-ary Signaling Schemes – Synchronization methods.

## Unit IV : Error Control Coding

Methods of controlling errors – types of errors and codes – Linear block codes – Binary Cyclic codes – Convolutional codes.

## Unit V : Coded transmission of analog signals

PCM system – Noise in PCM systems – Differential PCM systems – Delta modulation systems – Noise in delta modulation – Comparison of PCM and DM systems – Q-level differential PCM systems.

**Books for Study :**
1. Digital and Analog Communication Systems – K.Sam Shanmugam – Wiley India Edition – 2007 reprint.
[Sections 1.1, 1.2, 1.3, 2.1, 2.6, 2.7.1, 5.1, 5.2, 5.3, 5.4, 5.5.2, 5.6, 5.7.2, 5.7.3, 8.1 to 8.5, 8.7, 8.8, Sections 9.1 to 9.6, 9.6, 10.4.1 to 10.4.8]

**Books for Reference :**
2. Modern Digital and Analog Communication Systems – B.P.Lathi – Oxford University Press – 3rd edition – 2008 impression.
3. Communication Systems ANALOG and DIGITAL – R.P.Singh & S.D.Sapre – Tata McGraw Hill Publishing Co. Ltd. – 1995.

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**UNIT I : 8085 µP Architecture and introduction to Assembly language program**

Functional block diagram – registers, ALU, bus systems – timing and control signals – machine cycles- instruction classification – instruction formats – addressing modes

**UNIT II: 8085 µP Instructions**

Data transfer operations – arithmetic, logical, branch operations – writing ALP-looping, counting and indexing – additional data transfer and 16-bit arithmetic instructions – arithmetic operations related to memory – rotate and compare instructions

**UNIT III : Counters, Time delays, Stack and Subroutines**

Counters and time delays – hexa decimal counter – modulo ten counter – generating pulse waveforms

Stack – subroutine – conditional call and return instructions – advanced subroutine concepts

**UNIT IV: Interfacing concepts**

Peripheral I/O instructions – device selection and data transfer – input interfacing-interfacing o/p displays – 7 segment LED displays – interfacing DIP switches – memory interfacing – interrupts – vectored interrupts – 8255 PPI block diagram – simple I/O mode – BSR mode

**UNIT V:**

Interfacing data converters – D/A converter-A/D converter – block diagram of 8253PIT – programming 8253 – 8253 as a counter – 8259A Programmable interrupt controller – direct memory access (8237chip)

**Text Book** :
Ramesh S. Gaonkar, Microprocessor architecture, programming and application with 8085/8080 A, IV ed., Penram international publication house, 1997
UNIT I: Sections : 3.1, 3.2, 3.3, 5.1-5.5
UNIT II: Sections : 6.1-6.5, 7.1 -7.5
UNIT III: Sections : 8.1 – 8.4, 9.1-9.4
UNIT IV: Sections : 4.1 – 4.3, 3.3, 12.1,12.2, 15.11 – 15.13
UNIT V: Sections : 13.1, 13.21 – 13.23, 15.41 – 15.43, 15.51 – 15.53, 15.6

**Reference Books**:
1) A.P.Mathur, Introduction to Microprocessors, TMH, III ed., 2004
2) Douglas V.Hall, Microprocessor and interfacing, programming and
 hardware , Mc Graw Hill Inc., 1992.

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PROGRAMME : B.Sc., E & C            COURSE CODE   : 5EC3 (2008 on)
COURSE TITLE : MICROWAVE  &         QN.NO         : 4334
                RADAR SYSTEMS
TIME  : 3 Hours                     MAX.MARKS :75

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## Unit I : Introduction to microwaves

Definition – Reasons for using microwaves – EM spectrum – wavelength and frequency – microwave systems – units – characteristics of microwaves – applications – comparisons of AC and DC microwave signals.

## Unit II : Microwave sources

Reflex Klystron – Magnetron – Gunn effect – Gunn diode – Varactor and tunnel diode – avalanche transit time devices – Impatt diode and trapatt diode

## Unit III : Microwave communication systems

Simplified microwave system – block diagram – need for diversity – frequency and space diversity – protection switching arrangements – microwave radio station system gain

## Unit IV : RADAR systems

Radar equation – radar block diagram – Doppler effect – CW Doppler radar – frequency modulated CW radar – MTI radar

## Unit V : Radar transmission and receivers

Tracking with radar – monopulse radar – conical scan and sequential lobing – Radar display – Applications of radar

**Text Books :**
1. Electronic communication systems – Kennedy, Davis – Tata McGraw Hill India Publishing Co. – Fourth Edition
   Chapter 11
2. Advanced Electronic communication systems – Wayne Tomasi – Prentice Hall of India – Sixth Edition
   Chapter 13
3. Radar Systems – Skolnik – Tata McGraw Hill India Pub. Co – Third Edition (2006)
   Chapter 2, 3, 10, 11

**Book for Reference :**
4. Microwave engineering – T.Jayanthi & K.S.Shaji – Anuradha Publications (2003)

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**PROGRAMME : B.Sc., E & C**      **COURSE CODE : 5EC4 (2008 on)**
**COURSE TITLE : CONTROL SYSTEMS**    **QN.NO : 4336**
**TIME : 3 Hours**      **MAX.MARKS :75**

## Unit I : Introduction

The Control System – Differential equations of Physical Systems : Mechanical Systems – Electrical Systems – Analogous system – Thermal Systems – Fluid Systems – Pneumatic Systems – Transfer functions – Block Diagram Simplification – Signal Flow graphs.

## Unit II : Control Systems and Components

Control Components – DC Servomotors – AC Servomotors – Synchros – Stepper motors – Hydraulic Systems – Pneumatic Systems.

## Unit III : Time Response

Introduction – Standard Test Signals – Time response of first-order systems – Time response of second order systems – Steady state errors and error constants – effect of adding a zero to a system – PD, PI and PID modes of feedback control.

## Unit IV : Frequency Response

Introduction – correlation between time and frequency response – Polar plots – inverse polar plots – Bode plots.

## Unit V : Stability

The concept of stability, Necessary conditions for stability – Hurwitz stability criterion – Routh stability criterion – The Root Locus – Construction of root loci – Stability in frequency domain : Nyquist Criterion.

**Book for Study:**
1. Control Systems Engineering – Nagrath & Gopal – New Age International Publishers – Third Edition – 2003
   Unit I : Sections 1.1, 2.1, 2.2, 2.4, 2.5, 2.6
   Unit II : Sections 4.1, 4.3, 4.4, 4.5, 4.6
   Unit III : 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7
   Unit IV : 8.1, 8.2, 8.3, 8.4
   Unit V : 6.1, 6.2, 6.3, 6.4, 7.1, 7.2, 7.3, 9.1, 9.2, 9.3

**Books for Reference :**
2. Modern Control Engineering – Ogata – 4th Edition – Pearson Education – 2003
3. Control Engineering Theory and Practice – N. Bandyopadhyay – PHI – 2003
4. Control Systems – A. Nagoorkani – 1st Edition - RBA Publications – 2006 reprint

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**PROGRAMME : B.Sc., E & C**      **COURSE CODE  : 5SEC (2008 on)**
**COURSE TITLE : BIOMEDICAL**      **QN.NO     : 4338**
               **INSTRUMENTATION**
**TIME  : 3 Hours**      **MAX.MARKS :75**

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### Unit I : Bio-electric potentials

Resting and action potentials – Propagation of action potentials – The Bio-electric potentials – Bio-potential electrodes.

### Unit II : Cardio-Vascular Measurements

Electro-Cardiography – ECG amplifiers – Electrodes and leads – ECG recorder principles – Measurement of Blood pressure – Sphygmomanometer – Programmed Electro-sphygmomanometer.

### Unit III : Ultrasound Diagnostics

Principles of ultra-sonic measurement – Properties of ultrasound – Basic modes of transmission – Ultrasonic imaging – Ultra-sonic diagnosis.

### Unit IV : Measurements from the Nervous System

Neuronal firing measurements – Electroencephalogram measurements – Electromyographic measurements.

### Unit V : X-ray and Radio-Isotope Instrumentation

Production and detection of ionizing radiation – Instrumentation for Diagnostic X-rays – Visualization of X-rays – Instrumentation for the medical use of radio-isotopes – Radiation therapy.

### Books for Study :

1. Biomedical Instrumentation and Measurements – Leslie Cromwell, Fred Weibell, Erich Pfeiffer – Second Edition – PHI – 1999.

[Sections 3.1, 3.2, 3.3, 4.2, 6.1 (upto 6.1.4), 6.2 (upto 6.2.2), 9.2, 9.3, 10.7, 14.1, 14.2, 14.4, 14.5]

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|---|---|
| **PROGRAMME : B.Sc., E & C** | **COURSE CODE   : 6EC1(2008 ON)** |
| **COURSE TITLE : MICROCONTROLLER 8051** | **QN.NO          : 4340** |
| **TIME  : 3 Hours** | **MAX.MARKS :75** |

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### UNIT I : The 8051 Architecture

Introduction – 8051 µC hardware – I/O pins , ports and circuits – external memory – counter and timers – serial data I/O – 8051 µC interrupt structure – timer and serial functions

### UNIT II : Programming the 8051 µC

Introduction – addressing modes – external data moves – code memory read only data moves – push and pop op-codes – data exchanges – byte and bit level logical operations – rotate and swap operations

### UNIT III: Arithmetic, Jump and Call instructions

Introduction – flags –incrementing, decrementing, addition, subtraction, multiplication and division operations – decimal arithmetic – jump and call program range – jumps –calls and subroutines – interrupts and returns

### UNIT IV : 8051 µC design

Introduction – microcontroller specification – microcontroller design – timing subroutines ( pure software and hardware delays only) – Serial data transmission ( character transmission using a time delay only ).

### UNIT V: Applications of 8051 µC

Introduction – keyboards (upto scanning program for small keyboards only) - displays – 7 segment display – LCD display – D/A and A/D conversions

**Text Book :**
The 8051 Microcontroller, Kenneth J. Ayala, Penram International, II ed.,
UNIT I   : Sections: 3.0 – 3.6
UNIT II   : Sections: 4.6, 5.0 -5.6, 6.0 -6.4
UNIT III : Sections: 7.0 – 7.7, 8.0 – 8.6
UNIT IV : Sections:9.0 – 9.2, 9.4, 9.6( upto page 221)
UNIT V  : Sections: 10.0, 10.1(upto page 238), 10.2, 10.4

**Reference Books :**
1. Microcontroller and their applications – I.P.Singh, IMPACT learning materials series IIT, New Delhi, 1997
2. Microcontroller hand book – INTEL -1984

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PROGRAMME : B.Sc., E & C            COURSE CODE   : 6EC2 (2008 On)
COURSE TITLE : OPTICAL FIBRE            QN.NO            : 4342
                       COMMUNICATIONS
TIME  : 3 Hours                                MAX.MARKS :75

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**Unit 1: Introduction to optical fibers:**
        Forms of communication system –  The Evolution of Fiber optic systems – Elements of an optical fiber transmission link -  Basic optical laws and Definitions – Optical Fiber modes and configuration  - Fiber types – Rays and modes – Step index fiber structure – Ray optics representation – Wave representation – Mode theory for circular wave guides – Maxwell's equation  -  Wave guide equation – Wave equation for step index fiber – Modal equation – Modes in step index fiber –Linearly polarized modes  - Single mode fibers – Graded index fiber structure.

**Unit 2: Signal Degradation in optical fibers:**
        Attenuation – Absorption losses – Scattering losses – Bending losses – Core and Cladding losses – Signal Distortion in optical wave guides – Information capacity determination -  Group delay – Material Dispersion – Wave guide dispersion – Signal distortion in single mode fibers – Inter modal distortion – Pulse broadening in Graded  index wave guides – Mode coupling.

**Unit 3: Optical Fiber Sources:**
        Direct and Indirect Band Gap – Semiconductor device Fabrication – LED structures – Light source materials – Internal quantum Efficiency – Modulation capability – Power Band width product – Laser Diode – Laser diode Modes and threshold condition – Resonant Frequencies – Laser Diode structures and radiation pattern -  Single mode lasers – Modulation of Laser diodes -  Temperature effects.

**Unit 4: Fiber Optical Detectors:**
        Physical principles of photodiodes – The pin photo detector – Avalanche photodiodes – photo detector noise – Noise sources – Signal to Noise Ratio - Detector response time – Depletion layer photo current – Response time - Avalanche multiplication noise – Temperature effect on Avalanche gain.

**Unit 5: Digital Transmission Systems:**
        Point - to – Point links - System considerations – Fiber splicing and connectors – Link power budget – Rise-time budget – Noise effects on system performance – Modal noise – Mode partition noise – Chirping – Reflection noise – Operational principles of WDM.

**Book for Study**:
Optical Fiber Communications - Gerd Keiser, McGraw Hill Inc. Second Edition 1991.
Unit 1:   1.1 to 1.3, 2.2 to 2.4, 2.4.1 to 2.4.6, 2.5, 2.6
Unit 2:   3.1 to 3.4
Unit 3:   4.1.4, 4.1.5, 4.2, 4.3
Unit 4:   6.1 to 6.5
Unit 5:   8.1, 8.1.1 to 8.1.3, 8.4, 5.5, 5.6, 11.1

**Reference :** Optical Fibre Communication – John M Senior – PHI – 1998

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PROGRAMME : B.Sc., E & C          COURSE CODE   : 6EC3(2008 On)
COURSE TITLE : DIGITAL SIGNAL PROCESSING     QN.NO        : 4344
TIME  : 3 Hours          MAX.MARKS :75

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### Unit I : Classification of Signals & Systems, z-transforms

Classification of Signals - Singularity function - Classification of System - Representations of Systems - Application of Laplace Transformation in analyzing Networks – Z-transforms - Definition – Properties – Evaluation of Inverse Z-transform –Properties of a DSP System.

### Unit II : Discrete and Fast Fourier Transform

The Discrete Fourier Transform – Relationship of the DFT to other transforms – Properties of the Discrete Fourier Transform - The Fast Fourier Transform – Decimation-in-time Algorithm – Summary of steps of Radix-2 DIT-FFT Algorithm – Decimation-in-frequency Algorithm – Summary of step for Radix-2 DIF-FFT Algorithm – Differences and Similarities between DIT and DIF Algorithms.

### Unit III : Infinite and Finite Impulse Response Filters

Design of Digital filters from Analog Filters – Frequency Transform in Analog Domain – Steps to design analog  Butterworth & Chebyshev low pass filters – Design of IIR filters from analog filters – Frequency Transformation in Digital Domain –Realization of Digital filters (Direct, cascade, parallel, lattice-ladder) – Linear Phase FIR Filters – Frequency Response of Linear Phase FIR Filters – Design of FIR Filters using Windows – Realization of FIR Filters (Transversal, Linear phase, lattice structure)

### UNIT IV : Finite Word Length Effects in Digital Filters

Number Representation – Types of Number Representation – Floating Point Numbers – Quantization Noise – Quantization in floating Point Realization of IIR Digital Filters - Finite Word Length Effects in FIR Digital Filters – Quantization Effects in the Computation of the DFT

### UNIT V : Statistical Digital Signal Processing

Introduction – Random Processes – Random Signal – Random Variable – Discrete-time Random Signals – Statistical Properties of Random Signal – Power Density Spectrum - Estimation – Estimation of Autocorrelation – The Periodogram – The Use of DFT in Power Spectrum  Estimation.

**Text Books :**
1. Digital Signal processing – Salivahanan, Vallavaraj, Gnanapriya – Tata McGraw Hill – 2005.

[Sections 1.1, 1.2, 1.3, 1.5, 1.7, 3.12, 4.1, 4.2, 4.3, 4.4, 5.2]
2. Digital Signal Processing - P.Ramesh babu - Third Edition - Scitech Publications – 2006.

[Sections 3.4, 3.5, 3.6, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 5.3, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 6.1, 6.2, 6.3, 6.6, 6.9, 7.2, 7.3, 7.4, 7.6, 7.13, 7.14, 7.15, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.8, 9.12, 9.13, 9.14, 9.15]

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PROGRAMME : B.Sc., E & C          COURSE CODE   : 6EC4 (2008 ON)

COURSE TITLE : ANTENNA  &  WAVE          QN.NO          : 4346
                            PROPAGATION

TIME  : 3 Hours                          MAX.MARKS :75

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**Unit 1: Concepts of Basic Antenna:**
Basic antenna parameters – Radiation pattern,beam solid angle – radiation Intensity,beam efficiency – Directivity and Gain – Directivity and resolution – antenna Aperture – effective height – Reciprocity theorem (Statement only) –The radio communication link – fields from oscillation dipole – Antenna Field zones – Shape impedance consideration – linear,elliptical and circular polarization- poyting vector for elliptically and circularly polarized waves – the polarization ellipse and the poincare sphere.

**Unit 2: Point sources:**
Definition – power pattern – power theorem and it's application to an isotropic source, radiation intensity – examples of power patterns – field patterns – phase patterns – arrays of two isotropic point sources – nonisotropic but similar point sources and principles of pattern multiplication  - example of pattern synthesis by pattern multiplication – linear arrays of n isotropic point sources of equal amplitude and spacing  - null directions for arrays of n isotropic point sources of equal amplitude and spacing.

**Unit 3: Small antennas:**
Effects of Grounded on Antennas performance – Ground system – Effects of  Antenna height – Wave Antenna – medium frequency Antenna – General characteristics – High Frequency Antenna – Half wave dipole Antenna – Rhombic Antenna -  loop Antenna.

**Unit 4: Practical Antennas and Antenna measurement:**
Folded Dipole Antenna – Yagi Uda Antenna – Helical Antenna – Horn Antenna – Slot Antenna – Antenna with Parabolic Reflectors. **Antenna measurement**:   Impedance Measurement – Measurement of Gain – Antenna Efficiency.

**Unit 5:  Wave propagation:**
Fundamental equation for free space equation – Mode of propagation – Structure of Atmosphere – Characteristics of Different ionized regions – Sky wave propagation – Effects of the earths magnetic field on ionospheric Radio wave propagation – Effect of the earths magnetic field on refractive index of the ionosphere. **Terminology around ionosphere and sky wave propagation:** Virtual Height – MUF, LUF, Skip Distance, Fading (Explanation only, no derivation).

**Books for study:**
   1.  Antennas by John D.Krauss – Tata McGraw Hill – Third Edition
    Unit 1:  2.2-2.17,11.2; Unit 2: 4.2 to 4.5, 4.6.1 to 4.6.2, 4.7, 4.7.1 to 4.7.2, 4.8 to 4.14.
   2.  Antenna and wave propagation by K.D.Prasad – Satya Prakashan - 2008
    Unit 3:  8.3 to 8.5,  8.7 to 8.10, 8.14, 8.17.
    Unit 4:  9.2 to 9.3, 9.6, 9.7, 9.9, 9.18, 9.20,  9.21, 9.24, 9.28.
    Unit 5:  11.3 to11.9, 11.12 to 11.14, 11.16.5.

**Reference** : Antenna Theory and Practice – Rajeswari Chaterjee - Wiley Eastern Ltd – 2001
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| **PROGRAMME : B.Sc., E & C** | **COURSE CODE  : 6SEC (2008 ON)** |
| **COURSE TITLE : COMPUTER NETWORKS** | **QN.NO         : 4350** |
| **TIME  : 3 Hours** | **MAX.MARKS :75** |

### Unit I : Introduction

Uses of Computer networks : Business applications, home applications, mobile applications – Social issues – LAN – MAN – WAN – Wireless networks – Home networks – internetworks.

### Unit II : Network Software

Protocol hierarchies – Design issues for the layers – Connection oriented and connectionless services – service primitives – the relationship of services to protocols.

### Unit III : Reference Models

The OSI reference model – TCP/IP reference model – A comparison of the OSI and TCP/IP reference models – Critique of OSI and TCP/IP reference models.

### Unit IV : Example Networks

The internet – connection oriented networks : X.25, frame relay and ATM – Ethernet – Wireless LANs : 802.11.

### Unit V : The mobile telephone system

First generation mobile phones : Analog voice – Second generation mobile phones : Digital Voice – Third generation mobile phones : Digital voice and data.

### Books for Study :

1. Computer Networks – Andrew S Tanenbaum – PHI learning P. Ltd. – 4th Edition – 2008

[Book 1 : Sections 1.1 to 1.5, 2.6]

### Books for reference :

2. Computer Networks – Larry L Peterson and Bruce S Davie – Elsevier – 3rd edition – 2005 reprint.

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