B.SC. ELECTRONICS AND COMMUNICATION SCIENCE

SYLLABUS

B.Sc. DEGREE COURSE IN ELECTRONICS

AND COMMUNICATION SCIENCE

REVISED SYLLABUS

(w.e.f. 2013-14)

CORE 1 – BASIC CIRCUIT THEORY

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75
CREDITS: 4	SEMESTER: I	

COURSE OBJECTIVES:

1. To apply circuit theorems to simplify and find solutions to electrical circuits.

2. To solve simple circuits using ohm's law, Kirchhoff's laws and the properties of the elements.

3. To build up basic problem solving skills through organizing available information and applying circuit laws.

4. To Build up strong problem solving skills by effectively formulate a circuit problem into a mathematical problem using circuit laws and theorems.

5. To Simplify circuits using series and parallel equivalents and using Thevenin and Norton equivalents

6. To understand transient circuit response.

UNIT I

RESISTORS &CAPACITORS – Introduction to linear and non linear components (active and passive) **-** Types of resistors – Wire wound, Carbon composition , film type, Cermets', fusible resistors – Resistor color coding – Power rating of resistors – Series and Parallel combinations of resistors

Capacitor – Capacitor connected to a battery – Capacitance – Factors controlling capacitance – Types of capacitors – Fixed capacitors – Non electrolytic & electrolytic capacitors – Variable capacitors – Voltage rating of capacitors – stray circuit capacitors – leakage resistance – Capacitors in series & Parallel – Energy stored in capacitors – Troubles in capacitors – Checking of capacitors with Ohmmeter.

UNIT II

FUNDAMENTALS OF ELECTRICAL ELEMENTS – Circuits – Identifying the elements & the connected

terminology Introduction – Ohms law – Kirchhoff's current law – Kirchhoff's voltage law – Voltage division

technique – Concepts of series circuit - Current division technique – Concepts of parallel circuits –Internal

resistance of sources – Method of solving a circuit by Kirchhoff's laws – Loop analysis – Nodal analysis – simple problems.

UNIT III

NETWORK THEOREMS – Super position theorem – Thevenin's theorem – Norton's theorem – Thevenin– Norton conversion - theorem statement & simple problems.

UNIT IV

INDUCTORS & TRANSFORMERS – Inductors – Air core – Iron core – Ferrite core – Comparison of different cores – Inductance of a Inductor – Mutual Inductance – Coefficient of coupling – variable inductors – Inductors in series & Parallel without M – Reactance & Impedance offered by a coil – Q factor – Testing of inductor using multimeter.

Transformer working – Turns ratio – voltage ratio – current ratio – power in secondary –autotransformers – transformer efficiency – core losses – Types of cores.

UNIT V

ANALYSIS OF AC CIRCUIT – Generation of alternative EMF – Terminology – rms or effective value – average value of AC – form factor – Peak factor. Pure resistive circuit – Pure inductive circuit – Pure capacitive circuit – R-L-Series circuit - R-C series circuit – R-L-C series circuit –Resonance – Resonance in series R-L-C circuit –

TEXT BOOKS:

1. Sedha R.S. A TextBook of Applied Electronics, S. Chand & Company Ltd.

2. Muthusubramanian R. , Salivahanan S. Basic Electrical and Electronics Engineering, Tata McGraw Hill Education private Limited.

3. B.L., Narayanamoorthi M and others, Electricity & Magnetism - National Publishing Co., Chennai.

4. Murugeshan, R. Electricity & Magnetism by R. S. Chand & Company Ltd.

REFERENCE BOOKS:

1. Theraja V, Basic Electronics Solid state, S. Chand & Company Ltd.

2. Bernard Grob, Basic Electronics, McGraw-Hill Book Company

WEBSITES:

1. Khan academy.org

2. NPTEL

3. http://www.electronicsteacher.com

4. http://www.science-ebooks.com

5. http://www.abcofelectronics.com

6. www.ocw.mit.edu

7. www.academic.earth

Note: There is no change in the non major elective papers.

CORE 2 – MAIN PRACTICALS - 1

SUBJECT CODE:	PRACTICAL	MARKS: 100 INTERNAL: 40 EXTERNAL: 60
CREDITS: 4	SEMESTER: I	

(At least Seven experiments should be done for the Examination)

1. Study of, CRO, Multimeter and other Testing devices **(Study Purpose)**

2. Testing of components

3. To verify Ohm's Law using voltmeter & ammeter.

4. Study of Kirchoff 's law

5. Resistance in series & parallel.

6. Capacitance in series & parallel.

7. Study of super position theorem

8. Verification of Thevenin's Theorem.

9. Study of RC circuit – Series Resonance.

10. Study of Series Resonance RLC Circuits.

REFERENCE BOOKS

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.

2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.

CORE 3 – BASIC ELECTRONICS

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75
CREDITS: 4	SEMESTER: II	

COURSE OBJECTIVES:

1. To understand the use of diodes as power supply rectifiers.

2. To understand the operation of transistors as switching circuits.

3. To learn the tools and techniques of practical electronics and circuit design.

4. To understand the fundamentals of operation of the main semiconductor electronic devices.

5. To understand the fundamentals of special purpose diodes.

6. To familiarize the student with the analysis and design of basic transistor amplifier circuit.

UNIT I

BONDING IN SOLIDS – Cohesive energy – Types of bonds in crystals – Ionic – Covalent – Metallic – Molecular & Hydrogen bonds.

UNIT II

SEMICONDUCTOR BASICS – Conductor – Semiconductor – Introduction to Intrinsic and Extrinsic semiconductor – P type and N type semiconductor – PN junction diode – V-I characteristics – Half wave, Full wave & Bridge rectifier – expression for efficiency and ripple factor - Construction of Basic logic gates using Diodes

UNIT III

SPECIAL PURPOSE DIODES – Zener and Avalanche Break down, Zener diode - V-I characteristics regulated power supply using Zener diode- LED, Photodiode, PIN Diode, Varactor Diode, Tunnel Diode – Principle, Working & Applications.

UNIT IV

TRANSISTORS – Transistor symbols NPN & PNP – Transistor biasing for active, saturation & cutoff - Operation of a BJT - Characteristics of a transistor in CE, CB & CC modes – Early effect – Punch-through – Transistor testing

– Transistor as a switch – Transistor as an amplifier – UJT - VI characteristics - Construction of Basic logic gates using Transistors (qualitative analysis)

UNIT V

FIELD EFFECT TRANSISTORS – FET – Construction - Working - Static – Transfer characteristics – Parameters of FET – FET as an amplifier – MOSFET – Enhancement MOSFET – Depletion MOSFET – Construction & Working – Drain characteristics of MOSFET – Comparison of JFET & MOSFET.

TEXT BOOKS

1. Charles Kittel, (2004) , (8th edition), Introduction to Solid State Physics
2. S.O. Pillai., (6th edition), Solid State Physics, New Age International (P) Limited.
3. Theraja B.L., Basic Electronics Solid state, S. Chand & Company Ltd.

4. Albert Paul Malvino, Donald P. Leach, Digital principles and applications, McGraw-Hill

5. Godse A.P., Bakshi U.A., (2009), (1st edition), Electronics Devices, Technical Publications Pune.

REFERENCE BOOKS

1. Roy Choudary D., Shail Jain, Linear Integrated Circuits, New Age International Pvt. Ltd., 2000.

2.   Sedha R.S., A TextBook of Applied Electronics, S. Chand & Company Ltd.

3.   Jacob Millman and Christos C. Halkias (2008) Integrated Electronics, Tata Mcgraw-Hill

4. Robert L. Boylestad, Louis Nashelsky (10th edition), Electron Devices and Circuit Theory, Dorling Kindersley(India Pvt. Ltd.)

WEBSITES

· Khan academy.org

· NPTEL

· http://www.electronicsteacher.com

· http://www.science-ebooks.com

· http://www.abcofelectronics.com

· www.ocw.mit.edu

· www.academic.earth

CORE 4 – MAIN PRACTICALS - II

SUBJECT CODE:	PRACTICAL	MARKS: 100 INTERNAL: 40 EXTERNAL: 60
CREDITS: 4	**SEMESTER: II**	

(At least seven experiments should be done for the Examination)

1. V-I Characteristics of Junction Diode.

2. Rectifier circuits – Half Wave, Center-tapped Full wave.

3. Bridge Rectifier.

4. V-I Characteristics of Zener Diode.

5. Regulated Power Supply using Zener Diode.

6. Transistor as a switch.

7. Transistor Characteristics of CE Configuration.

8. Logic gates using Diodes.

9. Logic gates using Transistor.

10. Characteristics of UJT.

11. Characteristics of JFET

REFERENCE BOOKS

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.

2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.

3. Srinivasan M. N., and Others, A text book of practical Physics, Sultan Chand and Sons, New Delhi.

CORE 5 – AMPLIFIERS AND OSCILLATORS

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 4   **SEMESTER: III**

COURSE OBJECTIVES:

1. To understand the operations and the applications of the various classes of an Amplifier.

2. To study the operation of Push-Pull Amplifier.

3. To familiarize the student with the analysis and design of basic transistor amplifier circuits, feedback amplifiers, wave shaping and multi vibrator circuits.

4. To study the effect on Input Impedance and Frequency on Common Emitter Amplifier.

5. To study the operation of Hartley, Colpitts, RC Phase shift, crystal and wien bridge oscillators.

6. To determine the operating characteristic of Unijunction Transistor Oscillator.

UNIT I

AMPLIFIERS – General principles of small signal amplifiers – Load line analysis AC & DC – classifications of amplifiers – RC coupled amplifiers – Working - Frequency response (Qualitative Analysis) – Concept of Multistage amplifiers – Transformer coupled amplifiers – Working - Frequency response (Qualitative Analysis) - Direct Coupled amplifier – working - emitter follower.

POWER AMPLIFIERS - Class A – Single ended amplifier - Class B Transformer coupled pushpull amplifier – Crossover distortion – Complementary Symmetry Class-B Push-Pull Amplifier - power dissipation and output power calculations.

UNIT II

FEEDBACK AMPLIFIERS – Principles of feedback amplifiers – Transfer gain with feedback – General characteristics of negative feedback amplifier – effect of negative feedback on gain – gain stability – distortion and Bandwidth – Types of feedback.

UNIT III

OSCILLATORS – Feedback requirements of oscillators – Barkhausen Criterion for oscillation – Hartley, Colpitts, Phase shift and Wien bridge oscillators - Working – Frequency of oscillations – Crystal oscillator – UJT Relaxation oscillator.

UNIT IV

OPERATIONAL AMPLIFIERS – Op-Amp supply voltages – IC identification - Op-Amp parameters - Op-Amp as a voltage amplifier – Inverting amplifier – non-inverting amplifier – Voltage follower.

IC 555 timer - pin functions - internal architecture

UNIT V

OP-AMP CIRCUITS – Summing amplifier – Differential amplifier – Op-amp frequency response – Comparator – Integrator – Differentiator – Triangular Wave generators – Square Wave generators – Active filter(Basics) - Low pass filter - High pass filter – Band pass filter – Sample & Hold Circuits.

IC 555 APPLICATIONS - Astable, Monostable and Schmitt trigger.

TEXT BOOKS:

1. Jocob Millman and Christos C.Halkias, Integrated Electronics, McGraw Hill.

2. D.Roy Choudary, Shail Jain, Linear Integrated Circuits, New Age International Pvt. Ltd., 2000.

3. Sedha, R.S. A TextBook of Applied Electronics, S. Chand & company Ltd.

4. Ramakant A. Gayakwad, OP-AMP and Linear ICs, 4th Edition, Prentice Hall / Pearson Education, 1994.

5. G.K.Mithal, Basic Electronic Devices and circuits, 2nd Edition, G.K.Publishers Pvt. Ltd., 1998.

REFERENCE BOOKS:

1. Allen Mottershead, Electronic Devices and Circuits-an Introduction - Prentice Hall.

2. Mithal G.K., Electronic Devices and Circuits, Khanna Publishers.

3. Donald L.Schillling, Charles Belove, Discrete and Integrated Electronic Circuits, McGraw Hill.

5. Jacob Milliman, Micro Electronics, McGraw Hill.

WEBSITES:

1. Khan academy.org

2. NPTEL

3. http://www.electronicsteacher.com

4. http://www.science-ebooks.com

5. http://www.abcofelectronics.com

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CORE 6 – MAIN PRACTICALS - III

SUBJECT CODE:	PRACTICAL	MARKS: 100 INTERNAL: 40 EXTERNAL: 60
CREDITS: 4	**SEMESTER: III**	

[At least 4 from experiments (1-8) and 4 from experiments (9-16)]

1. Single stage R-C Coupled Amplifier

2. Emitter Follower

3. FET Amplifier

4. Colpitt's Oscillator

5. Hartley Oscillator

6. R-C phase Shift Oscillator

7. Relaxation Oscillator

8. IC Regulated Power Supply

9. OPAMP – Inverting and Non-inverting modes, Unity Follower

10. Operational Summing Amplifiers – Inverting and non-inverting modes.

11. OPAMP – Integrator and Differentiator

12. OPAMP – Square wave generator

13. OPAMP – Sine Wave Generator

14. Monostable multivibrators using IC 555 timer

15. Astable multivibrator using IC 555 timer

16. Schmitt Trigger using IC 555 timer.

REFERENCE BOOKS

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.

2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.

3. Srinivasan M. N., and Others, A text book of practical Physics, Sultan Chand and Sons, New   Delhi.

CORE 7 – DIGITAL ELECTRONICS

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 4

SEMESTER: IV

COURSE OBJECTIVES:

1. To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.

2. To perform decimal, octal, hexadecimal, and binary conversions.

3. To apply Boolean algebra to solve logic functions.

4. To implement simple logical operations using combinational and sequential logic circuits.

5. To identify and differentiate digital electronics applications.

UNIT I

NUMBER SYSTEMS AND CODES – Decimal, binary, octal, hex numbers, conversion from one to another – codes, BCD, excess 3, gray codes conversion from one to another – Error detection codes.

UNIT II

BOOLEAN ALGEBRA AND THEOREMS – Basic, Universal logic gates – Boolean Identities - Boolean theorems De Morgan's Theorem – sum of products, products of sums expressions, simplification by Karnaugh Map method, simplification based on basic Boolean theorems – don't care conditions.

UNIT III

COMBINATIONAL DIGITAL CIRCUITS – Arithmetic Building blocks, Half & Full Adders and Half & Full Subtractors, BCD adders – multiplexers, De-multiplexers, encoders, decoders – Characteristics for Digital ICs - RTL, DTL, TTL, ECL CMOS (NAND & NOR Gates).

UNIT IV

SEQUENTIAL DIGITAL CIRCUITS – Flip-flops, RS, Clocked SR, JK, D, T, master-slave Flip flop – Conversion of Flip flop - shift registers – ripple counters – synchronous counters and asynchronous counters (4-bit counter).

UNIT V

BLOCK DIAGRAM OF MEMORY DEVICE – ROM Organization - PROM Organization – PLA (Programmable Logic Array) – PAL (Programmable Array Logic) – Realization of functions using PROM

TEXT BOOKS

1. R.P. Jain, "Modern digital Electronics",3rd Edition, TMH, 2003.

2. Puri, V.K., Digital Electronics, Tata Mc Graw Hill

3. Marris mano M., Computer System Architecture, 2nd Edition, Prentice Hall, 1998

4. Malvino and Leach, Digital Principles and applications, McGraw Hill, 1996 IV Edition

REFERENCE BOOKS

1. Millman J., Micro Electronics, McGraw Hill International Book Company, New Delhi 1990 Edition.

2. William H. Gothman, Digital electronics – An int. to theory and practice,2nd Edition, PHL of India, 2007.

3. Morris Mano M., "Digital Logic and Computer Design" PHI 2005.

4. Morris Mano M. "Digital Design" PHI 2005.

5. Godse A.P., Digital Electronics, Technical Publications.

WEBSITES

1. Khan academy.org

2. NPTEL

3. http://www.electronicsteacher.com

4. http://www.abcofelectronics.com

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CORE 8 - MAIN PRACTICAL - IV

SUBJECT CODE:	PRACTICAL	MARKS: 100 INTERNAL: 40 EXTERNAL: 60
CREDITS: 4	**SEMESTER: IV**	

(At least EIGHT experiments should be done for the Examination)

1. Universality of NAND & NOR gates.

2. Verification of Boolean laws using NAND gates (Associative, Commutative & Distributive Laws)

3. Verification of Boolean laws using NOR gates (Associative, Commutative & Distributive Laws)

4. Sum of Products using NAND gates and Product of Sums using NOR Gates.

5. 4-bit binary parallel adder and Subtractor IC 7483

6. Counter using IC 7473

7. Study of RS, D, T and JK Flip-Flops with IC's.

8. Study of Encoder & Decoder.

9. Study of Multiplexer & De-Multiplexer.

10. Half and Full Adder using Simple & NAND Gates.

11. Half and Full Subtractor using Simple & NAND Gates.

12. Study of 7490 BCD Counter – MOD Counters.

13. BCD to Seven segment decoder 7447/7448.

REFERENCE BOOKS

1. Zbar, Malvino and Miller ,Basic Electronics, A Text Lab Manual , Tata McGraw Hill.

2. R.Sugaraj Samuel & Horsley Solomon, B.E.S. Practical .

CORE 9 - MICROPROCESSOR (INTEL 8085)

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75
CREDITS: 4	**SEMESTER: V**	

COURSE OBJECTIVES:

1. To know the microprocessor as a programmable digital system element.

2. To illustrate some basic concepts of microprocessors through the use of assembly language programming.

3. To develop an in-depth understanding of the operation of microprocessors and machine language programming & interfacing techniques.
4. To design simple interfaces to Intel-8085.
5. To Comprehend the various peripheral interface circuits that are necessary for the operation of Intel-8085.

UNIT I

ARCHITECTURE OF 8085 MICROPROCESSOR – Demultiplexing address / data bus – Control Signal Generation and status signals – 8085 – pin-out diagram & functions - Interrupts - Priority Concept

INSTRUCTION SET OF 8085 – Instruction classification – addressing modes

UNIT II

MEMORY– Instruction cycle – machine cycle – T-state -Timing diagrams for Opcode Fetch Cycle Memory Read, Memory Write, I/O Read, I/O Write, – Functional explanation for RAM, ROM, EPROM, EEPROM.

UNIT III

PROGRAMMING EXERCISES – addition & subtraction(16-bit), multiplication, division, largest, smallest, block transfer (all 8-bit data), Binary to BCD, BCD to Binary, Binary to ASCII, ASCII to Binary, BCD to ASCII, ASCII to BCD (all 8-bit data) - Stack & Subroutines Concept – time delay using single register & calculations – Debugging a program.

UNIT IV

INTERFACING MEMORY – 2K X 8, 4K X 8 ROM, RAM to 8085, Interfacing an I/O port in Memory Mapped I/O and I/O Mapped I/O – Difference between I/O mapped and Memory Mapped I/O.

UNIT V

MICROPROCESSOR APPLICATIONS – Programmable peripheral devices (8255, 8253) – Pin functions, Different Modes & Block Diagram - Keyboard and Display Interface 8279 (Architecture) - Simple temperature controller – Simple traffic light controller.

TEXT BOOKS

1. Ramesh S. Gaonakar, Microprocessor Architecture, Programming and Application with the 8085-Penram International Publishing, Mumbai.
2. Ram, Fundamentals of microprocessors and microcomputers-Dhanpat Rai Publications, New Delhi
3. Vijayendran, Fundamentals of microprocessor-8085 – S. Viswanathan publishers, Chennai.

REFERENCE BOOKS

1. Mathur A.P., Introduction to Microprocessors., (3rd edn., Tata McGraw, New Delhi, 1995).
2. Leventhal L.A., Microprocessor Organisation and Architecture, Prentice Hall India.

WEBSITES:

·   Khan academy.org

- · NPTEL

- · www.ocw.mit.edu

- · www.academic.earth

CORE 10 - ANTENNAS AND TELEVISION ENGINEERING

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75
CREDITS: 4	**SEMESTER: V**	

COURSE OBJECTIVES:

1. To provide the basic knowledge about the fundamentals of antenna.

2. To describe the electromagnetic radiation with application to antenna theory and design.

3. To make the students understand the radio wave propagation phenomena in modern communication systems.

4. To understand the applications of the electromagnetic waves in free space.

5. To study the analysis and synthesis of TV Pictures, Composite Video Signal, Receiver Picture tubes and Television Camera Tubes.

6. To study the various Color Television systems with a greater emphasis on television standards.

7. To study the advanced topics in digital television and High definition television.

UNIT I

FUNDAMENTALS OF ANTENNA – Antenna parameters – Gain and directivity – Efficiency – Effective length – Bandwidth – Beam width – Radiation resistance – Polarization – Grounded and ungrounded antenna's – Effects of antenna height – Radiation Patterns

UNIT II

TYPES OF ANTENNAS – Microwave antenna's – Parabolic antenna – Horn antenna's – Lens antenna – Disc one antenna – Rhombic antenna.

UNIT III

WAVE PROPAGATION – Electromagnetic radiation – Propagation of Waves – Surface wave propagation – sky wave propagation – space wave propagation – Tropospheric scatter propagation – Virtual height – MUF – skip distance – Ionospheric abnormalitics – Introduction to waveguide.

UNIT IV

ELEMENTS OF TV SYSTEM – Picture transmission and reception – Sound transmission and reception – Synchronization – Receiver Controls – Colour television – Transmission & Reception – Image continuity – Number of Scanning lines – Scanning – Sequential – Interlaced Scanning – Picture tubes – Monochrome and colour picture tubes (Delta gun picture tube).

UNIT V

CAMERA TUBES – Image orthicon – Plubicon– color television system – fundamental concepts of three colour system – additive and subtractive colours.

ADVANCE TECHNIQUES – Introduction of CCD camera – HDTV – Digital TV – Video disc – Cable TV - VCR

TEXT BOOKS

1. Srinivasan. K.S., Analog Modulation & Systems

2. Srinivasan. K.S. Digital Communication

3. Bakshi K.A,., Bakshi A.V., Bakshi U.A., Antenna & wave propagation, (Technical publications 2009)

4. Gulati R. R., Monochrome and Colour Television (Wiley Eastern, New Delhi, 1995).

REFERNCE BOOKS:

1. Raju G.S.N., (2004) Antenna & wave propagation, Pearson education India.

2. Grob B., Basic Television and Video Systems,, McGraw Hill.

3. Veera Lakshmi A., Srivel R., (2010) Television And Video Engineering (Ane Books India,)

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2. NPTEL

3. http://www.electronicsteacher.com

4. www.ocw.mit.edu

5. www.academic.earth

CORE 11 - ELECTRICAL AND ELECTRONICS INSTRUMENTATION

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 4 **SEMESTER: V**

COURSE OBJECTIVES:

1. To introduce the basic concepts related to the operation of Electrical and Electronic Measuring Instruments.

2. To study the basics of design of analog and digital circuits used in electronic instrumentation.

3. To understand basic electronic instrument terminology.

4. To understand the proper application of electronic instruments.

UNIT I

DC INDICATION INSTRUMENTS – PMMC Galvanometer (D' Arsonal Movement) – Principle, Construction and Working – Conversion of Galvanometer into Ammeter, Voltmeter and Ohmmeter (Series and Shunt Types) – Multimeter – Loading Effect.

AC INDICATING INSTRUMENTS – Electrodynamometer – Principle, Construction and Working – Merits and Demerits – Rectifier Type Instruments – thermocouple Instruments (Contact & Non-contact types) – electrostatic Voltmeters – Principle, construction and Working – Watt-hour Meter.

UNIT II

DC BRIDGES – Wheatstone bridge – Determination of resistance – Kelvin Double Bridge – Determination of resistance.

AC BRIDGES – Maxwell's Bridge – Determination of Self-Inductance – Wien's Bridge – Determination of Frequency – Schering's Bridge – Determination of Capacitance.

UNIT III

OSCILLOSCOPES – Block Diagram – Deflection Sensitivity – electrostatic Deflection – Electrostatic Focusing – CRT Screen – Measurement of Waveform frequency, phase difference and Time Intervals – Sampling Oscilloscope – Storage Oscilloscopes (Introduction).

UNIT IV

INSTRUMENTATION AMPLIFIERS AND SIGNAL ANALYZER – Instrumentation amplifier – Electronic Voltmeter – Electronic Multimeter – Digital Voltmeter – Ohm meter – Function Generation – Wave analyzer – Fundamentals of Spectrum Analyzer.

UNIT V

TRANSDUCERS AND DISPLAY DEVICES – Strain gauge, Linear voltage differential transformer(LVDT), Resistance Thermometer – Photoelectric Transducer – LED,LCD – Seven Segment Display.

TEXT BOOKS

1. W.D. Cooper & A.D. Helfrick, Electronic Instrumentation and Measurement Techniques –Prentice Hall of India.
2. A.K. Sawhney, A course in Electrical and Electronic Measurements and Instrumentation –Dhanpat Rai and Sons.
3. P.B. Zbar, Electronic Instruments & Measurements –McGraw Hill International.

WEBSITES

- Khan academy.org
- NPTEL
- www.ocw.mit.edu
- www.academic.earth

CORE 12 - MAIN PRACTICALS - V

SUBJECT CODE:	PRACTICAL	MARKS: 100 INTERNAL: 40 EXTERNAL: 60

CREDITS: 4   **SEMESTER: V**

(At least EIGHT experiments should be done for the Examination)

Programs using Intel 8085

1. Addition & Subtraction (8 & 16-bits)

2. Multiplication & Division (8 – bit)

3. Square and Square root

4. Largest & Smallest number in the given array.

5. Ascending & Descending order.

6. Binary to ASCII & ASCII to Binary, BCD to ASCII & ASCII to BCD.

7. Block Transfer of Data.

8. Waveform generation using DAC interface.

Communication

9. Amplitude Modulation and detection.

10. Frequency Modulation and detection.

11. Pulse Amplitude Modulation and detection.

12. Pulse Width Modulation and detection.

13. Pulse Position Modulation and detection.

BOOKS FOR REFERENCE

1. Zbar, Malvino and Miller, Basic Electronics, A Text Lab Manual, Tata McGraw Hill.

2. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals.

3. Vijayendran V., Fundamentals of microprocessor-8085, S .Viswanathan publishers, Chennai.

CORE 13 - MICROCONTROLLER

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 4   **SEMESTER: VI**

COURSE OBJECTIVES:

1. To Familiarize with different types of Microcontroller.

2. To know 8051 microcontroller in detail.

3. To learn Programming and Interfacing with 8051 microcontroller.

4. To develop an in-depth understanding of the operation of microcontrollers & interfacing techniques.

5. To Understand and use various IO devices such as keypads, stepper motor, A to D and

6. To learn D to A converters.

UNIT I

8051 ARCHITECTURE – Introduction to Microcontroller – Comparison of Microcontroller & Microprocessor – 8051 Microcontroller – Block diagram – I/O pins, ports and circuits – External memory – Counter and Timers – Serial data I/O – Interrupts.

UNIT II

8051 INSTRUCTION SET - Addressing Modes – Logical operation: Byte level - Bit level – Rotate And Swap operation.

ARITHMETIC OPERATION Instructions affecting flags – Incrementing and Decrementing - Addition – Subtraction – Multiplication and Division – Example Program.

UNIT III

JUMP AND CALL INSTRUCTION – Introduction – The Jump and Call program Range – Jumps: Bit – Byte

Unconditional: Calls and Subroutine – Interrupts and Returns – Example program.

UNIT IV

INTERFACING – Keyboards – Displays - Stepper motor – ADC & DAC.

UNIT V

INTRODUCTION TO MICROCONTROLLERS – 6509 – PIC controllers - 6575 series – Introduction to Embedded Systems.

TEXT BOOKS

1. Kenneth J. Ayala, "The 8051 Microcontroller, Architecture, Program and Application" , Pen ram

   International.

2. . Muhammed Ali Mazidi, Janice Gillispie Mazidi "The 8051 Microcontroller and Embedded Systems" – Low Price Edition.

3. Microcontrollers: Theo & App by Ajay V.Deshmuk Tata McGraw-Hill Education,2005..

REFERNCE BOOKS

1. Microcontroller Hand Book, INTEL, 2008.

2. Microprocessor, Microcontroller & Applications by D.A Godse A.P Godse Technical Publications 2008.

WEBSITES

1. Khan academy.org

2. NPTEL

3. http://www.electronicsteacher.com

4. http://www.science-ebooks.com

5. http://www.abcofelectronics.com

6. www.ocw.mit.edu

7. www.academic.earth

CORE 14 - ADVANCED ELECTRONICS

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 4

SEMESTER: VI

COURSE OBJECTIVES:

1. To understand the fundamentals of optoelectronics and principles of the optoelectronic devices operation.

2. To be familiar with recent trends in optoelectronics.

3. To study the basic concepts of smart phones.

4. To understand the fundamental concepts of nanoelectronics.

UNIT I

OPTOELECTRONIC DEVICES – Introduction – Classification of OPTO Electronic Devices – Laser Diode - Photoconductive cells (Photo resistive cell, Photo diode, Avalanche Diode) – PhotoVoltaic Cell (or) Solar Cell – Laser Range Finder - Light-activated SCR (LASCR) – Optical Isolator.

UNIT II

MEMS – MEMS Definition – Materials for MEMS Manufacturing (Silicon, Polymers, Ceramics, Metals) - MEMS basic processes - Deposition processes, Patterning, Etching (Only Introductory Level) – Mentioning of Applications of MEMS.

UNIT III

Smart Phones – Symbian – Symbian- Android (operating system – Apple iPhone - Windows Phone - Palm OS - Bada operating system - Open-source development

UNIT IV

Nanoelectronics – Concept of 3D, 2D & 0D Nano Structures

UNIT V

Voice & Data communication - Wired/Wireless - Communication using IP networks, SDH, Routers.

TEXT BOOKS

1. Karl Goser, Peter Glosekotter, Jan Dienstuhl Nanoelectronics and Nanosystems , Springer, 2004

2. Dr.Arumugam M., Semiconductor Physics and Opto electronics, 1st Edition, Anuradha Publishers, 2003.

3. P. Rai-choudhury, "MEMS and MOEMS Technology and Applications", 1st Edition PHI, 2009.

WEBSITES:

· Khan academy.org

· NPTEL

· http://www.electronicsteacher.com

· http://www.science-ebooks.com

· http://www.abcofelectronics.com

· www.ocw.mit.edu

· www.academic.earth

CORE 15 - COMPUTER NETWORKS

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75
CREDITS: 4	SEMESTER: VI	

COURSE OBJECTIVES:

- · To learn the definition and basic terminology of Computer Networks.

- · To learn the different types of Computer Networks.

- To know the applications of Computer Networks in different fields.

- To know about Multiplexing, transmission media and signals.

- To learn the functioning of OSI model and to describe the responsibilities of each layer.

- To know about the individual components and functioning of the Internet.

- To learn about the hardware components used in the networking.

UNIT I

INTRODUCTION TO COMPUTER NETWORKS – Uses of network – Network structure – The OSI reference model concepts – Layers of the OSI model.

UNIT II

THE PHYSICAL LAYER – Different types of transmission medium - CODEC – Switching techniques – Channel allocation methods – ALOHA protocol-LAN protocol (any one protocol) – IEEE standards 802.3, 802.4 and 802.5.

UNIT III

THE DATA LINK LAYER – design issues – Concept of framing – Different methods – Error detection and correction: Single error correction and cyclic redundancy check.

UNIT IV

THE NETWORK LAYER – design issues – Internal organization of network layer – Congestion control algorithm, Leaky bucket algorithm and token bucket algorithm – Dijikstra routing algorithm.

UNIT V

Repeaters, bridges, routers and gateways – Brief introduction to the transport layer, session layer, presentation layer and application layer-Basic concepts of Internet – WWW.

TEXT BOOKS

1. Andrew S. Tanenbaum: Computer networks, Prentice Hall of India.

2. W. Stallings: Data and computer communication, Prentice Hall of India.

3. Behrouz and Forouzan: Introduction to data communications and networking, McGraw Hill.

WEBSITES:

- Khan academy.org

- NPTEL

- http://www.electronicsteacher.com

- http://www.science-ebooks.com

- http://www.abcofelectronics.com

- www.ocw.mit.edu

- www.academic.earth

ALLIED I

Paper I - MATHEMATICS I

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 5 **SEMESTER: I**

COURSE OBJECTIVES:

· To acquire knowledge in differentiation and Integration.

· To apply mathematical skills in core topics like signal analysis

· To solve a given problem using appropriate mathematical techniques.

· To understand and recognize the practical applications of mathematics.

· To use mathematical tools in appropriate technological devices.

UNIT I

THEORY OF EQUATIONS - Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, transformation of equation by increasing or decreasing roots by a constant, reciprocal equations, Newton's method to find a root approximately – simple problems.

UNIT II

MATRICES - Eigen values and Eigen-vectors, Cayley-Hamilton theorem (without proof) – verification Computation of inverse matrix using Cayley – Hamilton theorem

UNIT III

TRIGONOMETRY - Expansions of $\sin\theta$, $\cos\theta$, $\tan\theta$ expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$. Hyperbolic and inverse hyperbolic functions- Logarithms of complex numbers

UNIT IV

DIFFERENTIAL CALCULUS - nth derivatives, Leibnitz theorem (without proof) and applications, Jacobians, radius of Curvature and Curvature, Maxima and Minima of functions of two variables, – Simple problems.

UNIT V

INTEGRAL CALCULUS - Integration of a rational function of the type.

$$\int (px + q) / (ax^n + bx + c)\, dx$$

Integrals of the type $\int (px + q) / (ax^n + bx + c)\, dx; \& \int (dx) / (x + p\, ax^n + bx + c)$

Rational functions of sin x and cos x.

$$\int (dx)/(a + b \cos x); \qquad \int (dx)/(a + b \sin x); \qquad \int (a \cos x + b \sin x + c)/(p \cos x + q \sin x + r)\, dx$$

Evaluation of $\quad \int e^{nax} \cos bx\, dx; \quad \int e^{nax} \sin bx\, dx$

Bernouill's formula for integration by parts, Reduction Formula

TEXT BOOKS

- Vittal P. R., Allied Mathematics, (Margham Publications).
- Narayanan S., Ancillary mathematics, Viswanathan publishers.
- Singaravelu A., Allied Mathematics, Meenakshi Agency

REFERENCES

- Duraipandian P., Udayabaskaran S., Allied Maths volumes 1 and 2, Muhil publishers, Chennai.
- Dipak Chatterjee, Integral calculus and differential equations, Tata McGraw Hill publishers co Ltd.
- Kandasamy P., Thilagavathi K., Allied Mathematics, S.Chand and Co.

WEBSITES

- Khan academy.org
- NPTEL
- Jain R.K., Iyengar S.R.K., Advance Engineering Mathematics, Narasa Publishing House, www.en.wikipedia.org/wiki/multiple_integral
- Shankar Rao.G, Engineering Mathematics- Volume I, I.K.International Pvt.Ltd., www.books.google.co.in.
- Michael Corral, Vector Calculus, www.mecmath.net/calc3book.pdf

ALLIED I

Paper II - MATHEMATICS II

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 5   **SEMESTER: II**

COURSE OBJECTIVES:

· To acquire knowledge in differentiation and Integration.

· To apply mathematical skills in core topics like signal analysis

· To solve a given problem using appropriate mathematical techniques.

- To understand and recognize the practical applications of mathematics.

- To use mathematical tools in appropriate technological devices.

UNIT I

FOURIER SERIES – Fourier series for functions in $(0, 2\prod)$, $(-\prod, \prod)$, Even - Odd functions, Half range cosine and sine series.

UNIT II

ORDINARY DIFFERENTIAL EQUATIONS – Second order differential equations with constant coefficients.

$$(a X^2 + b X + c)y = \acute{\varnothing}(x)$$

where $\acute{\varnothing}(x) = x^m, e^{ax} x^m, e^{ax} \sin mx, e^{ax} \cos mx,$

Second order differential equation with variable co efficient, Variation of Parameters.

UNIT III

PARTIAL DIFFERENTIAL EQUATIONS – Formation, complete integrals and general integrals, four standard types of Lagrange's equations

UNIT IV

LAPLACE TRANSFORMS – Laplace transformations of standard functions and simple properties, inverse laplace transforms Application to solution linear differential equations or order 1 and 2 – simple problems.

UNIT V

VECTOR ANALYSIS – Scalar point functions, vector point functions, gradient, divergence, curl directional derivatives, normal to a surface. Line and surface integrals; Gauss, Stoke's and Green's theorems (without proof)- Simple problems.

TEXT BOOKS

- Vittal P. R., Allied Mathematics, (Margham Publications).

- Narayanan S., Ancillary mathematics, Viswanathan publishers.

- Singaravelu A., Allied Mathematics, Meenakshi Agency

REFERENCES

- Duraipandian P., Udayabaskaran S., Allied Maths volumes 1 and 2, Muhil publishers, Chennai.

- Dipak Chatterjee, Integral calculus and differential equations, Tata McGraw Hill publishers co Ltd.

- Kandasamy P., Thilagavathi K., Allied Mathematics, S.Chand and Co.

WEBSITES

- Khan academy.org

- NPTEL

- Jain R.K., Iyengar S.R.K., Advance Engineering Mathematics, Narasa Publishing House, www.en.wikipedia.org/wiki/multiple_integral

- Shankar Rao.G, Engineering Mathematics- Volume I, I.K.International Pvt.Ltd., www.books.google.co.in.

- Michael Corral, Vector Calculus, www.mecmath.net/calc3book.pdf

ALLIED II

Paper I - BASIC PHYSICS - I

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 3   **SEMESTER: III**

COURSE OBJECTIVES:

- Physics is a systematic study of the natural world, a discipline that measures reality through application of observation with logic and reason. In order to make use of such a discipline we need certain foundational information.

- To provide basic principles and fundamentals of Physics.

- To understand What is Physics and the different fields of Physics.

- To understand the fundamental laws and their applications in measuring many physical quantities.

- To prepare students for careers where Physics principles can be applied to the development of Technology.

UNIT – 1

ROTATION : Moment of inertia – Radius of gyration – Moment of inertia of a circular ring, circular disc, solid sphere – Kinetic energy of a rolling object – Acceleration of a body rolling down an inclined plane – Uniform circular motion – Centripetal force – Banking of curved tracks.

UNIT – 2

ELASTICITY: stress – strain diagram – factors affecting elasticity -Young's modulus – Bending moment – Bending of beams – Young's modulus by non-uniform bending – Rigidity Modulus - Torsion in a wire – Torsional Pendulum – Definition of Poisson's ratio.

UNIT – 3

VISCOSITY: Streamline and turbulent flow – Comparison of viscosities by burette method – – Stoke's law – Terminal velocity – Viscosity of a highly viscous liquid – Lubrication.

SURFACE TENSION: Molecular theory of surface tension – Excess of pressure inside a soap bubble – surface tension by drop weight method - interfacial surface tension.

UNIT – 4

HEAT AND THERMODYNAMICS – Thermal conductivity – Lee's Disc methods – Radial flow of heat –

Thermal insulation in buildings – Laws of thermodynamics – Carnot's cycle as heat engine and refrigerator –

Carnot's theorem – Concept of entropy

UNIT – 5

ACOUSTICS – Acoustics of buildings – Absorption coefficient – Intensity – Loudness – Reverberation time – Sabine's formula – Noise pollution – Noise control in a machine – Ultrasonics – production – Piezoelectric methods – Applications of ultrasonics in Engineering and Medicine.

TEXT BOOKS

1. Brijlal and Subramanyam -Properties of matter-S.Chand & Company.

2. Dr.Dhanalakshmi , Dr.Sabesan -Allied Physics

3. Kamalakkannan, Jayaraman- Allied Physics.

4. Srinivasan. M.N - A text book of Sound-. Himalaya Publishing house.

5. Mathur.D.S, 5th Edition, 2004 -Heat and Thermodynamics, Sultan Chand & Sons.

6. Dr. Arumugam M., 2nd edition ,Engineering Physics, , Anuradha Publications.

REFERENCE BOOKS:

1. Narayanamoothy and others-Mechanics

2. Halliday.D., Resnick.R. and Walker.J, Wiley, NY 1994.-Fundamentals of Physics.

3. Nelkon and Parker-Advanced level Physics

4. Weber, Manning and White-College Physics

5. Brijlal and Subramanyam-A text book of Sound

WEBSITES:

· Khan academy.org

· NPTEL

· www.ocw.mit.edu

· www.academic.earth

ALLIED II

Paper II - BASIC PHYSICS II

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75
CREDITS: 3	SEMESTER: IV	

COURSE OBJECTIVES:

- Physics is a systematic study of the natural world, a discipline that measures reality through application of observation with logic and reason. In order to make use of such a discipline we need certain foundational information.

- To provide basic principles and fundamentals of Physics.

- To understand What is Physics and the different fields of Physics.

- To understand the tools and methods that Physicists use range from balance scales to Ultrasonics, laser beam emitters.

- To understand the fundamental laws and their applications in measuring many physical quantities.

- To prepare students for careers where Physics principles can be applied to the development of Technology

UNIT – 1

OPTICS: Interference – Newton's rings – Measurement of wavelength and radius of curvature by Newton's rings with theory – Diffraction – Elementary theory of formation of spectra by transmission grating (normal incidence) – Determination of wavelength – Polarization – Optical activity – Brewster's law – Determination of specific rotatory power – Half shade polarimeter – Uses of polarized light.

UNIT – 2

MODERN PHYSICS: Photo electricity: Photoelectric emission – Einstein's theory – Millikan's experiment – Photoelectric cell – Photovoltaic cell – Photoconductive cell.

NUCLEAR PHYSICS : Properties of nuclei – size, charge, mass & spin – Binding Energy – Nuclear fission and fusion – liquid drop model – Semi empirical mass formula – Shell model – magic numbers.

RADIO ACTIVITY: Natural radioactivity – Artificial radioactivity – Radio isotopes – Uses of radio isotopes – Nuclear reaction – Q value of a reaction.

UNIT 3

LASER PHYSICS – Introduction- Principle of spontaneous emission and stimulated emission. Population inversion, pumping. Eienstein's A and B coefficients-derivation. Types of Lasers- Ruby Laser, Nd-YAG, Semiconductor lasers-Applications of lasers.

UNIT 4

MEDICAL PHYSICS – Doppler effect – Blood flow meter – Determination of upward and downward transit time – A-scan, B-scan and M-scan – X-rays – Introduction – Units of X-rays – Diagnostic technologies of X-rays – Radiography.

UNIT 5

FIBER OPTICS – Introduction – Principle and structure of optical fibers – Propagation of light through optical fibers – types of optical fibers – Optical fiber communication system (block diagram) – Fiber Optic Sensors – Medical Applications of Optical fibers- Endoscope- Engineering Applications of Optical fibers- Telecommunications-Computer Networks- Cable television – Advantages.

TEXT BOOKS

1. Brijal and Subramanian-Text book of optics ,S.Chand & Company.

2. Mr. Kamalakkannan and Jayraman..Allied Physics

3. R. Murugeshan- Modern Physics, S.Chand & Co.

4. Dr. Arumugam M, 2nd edition, 2002 -Engineering Physics, , Anuradha Publications.

5. Agarwal. G.P. , 3rd Edition , 2002- "Fiber-Optic Communication Systems" ,John Wiley & Sons

REFERENCE BOOKS

1. Thiagarajan-Laser Physics.

2. Gaur & Gupta- Engineering physics .

3. Dr. Arumugam-Bio Medical Instrumentation - Anuradha Publications.

4. Keiser. G. "Optical fiber communications", 4th Edition Tata McGraw-Hill, New Delhi, 2008-

WEBSITES

· Khan academy.org

· NPTEL

ALLIED II Paper III - BASIC PHYSICS PRACTICAL

SUBJECT CODE:	PRACTICAL	MARKS: 100 INTERNAL: 40 EXTERNAL: 60
CREDITS: 4	SEMESTER: IV	

(At least Seven experiments should be done for the Examination)

1. Young's Modulus by non-uniform bending – pin and microscope

2. Rigidity modulus by Torsional pendulum.

3. Surface tension and interfacial surface tension by drop weight.

4. Comparison of viscosities of liquids using un graduated burette.

5. Thermal conductivity of a bad conductor by Lee's disc method

6. Melde's string – frequency of a vibrator

7. Sonometer – determination of AC frequency

8. Spectrometer – i-d curve

9. Spectrometer – grating at normal incidence – determination of wavelength of mercury spectrum

10. Newton's rings – Wavelength of sodium light

REFERENCE BOOKS

1. Srinivasan M.N. and Others, A text book of practical Physics, Sultan Chand and Sons, New Delhi

2. Srinivasan M.N., Allied Practical Physics, Sultan Chand and Sons, New Delhi

3. Sugaraj Samuel R., Horsley Solomon, B.E.S. Practicals

FOUNDATION COURSE 1– ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 3 **SEMESTER: III**

COURSE OBJECTIVES:

· To familiarize the student to the concepts, calculations pertaining to electric, magnetic and electromagnetic fields so that an in depth understanding of antennas, electronic devices, Waveguides is possible.

· To analyze fields and potentials due to static charges .

· To evaluate static magnetic fields.

· To understand how materials affect electric and magnetic fields.

· To understand the relation between the fields under time varying situations.

· To understand principles of propagation of uniform plane waves.

UNIT I

ELECTROSTATICS – Coulomb's Law , Permittivity of free space - Relative permittivity - Electric intensity - Intensity due to a point charge - Electric potential - Relation between potential and intensity - Electric field and equipotential plots - Electric dipole - dipole moment - Normal electric Induction - Gauss theorem and Applications - Electric intensity due to a uniformly charged sphere, infinite cylinder and plane sheet of charge

UNIT II

DIELECTRICS – Dielectric polarization, Electric field in multiple dielectrics – boundary conditions, Poisson's and Laplace's equations – Capacitance-energy density – Dielectric strength Capacitance, computation of capacitance in simple cases (parallel plates); spherical and cylindrical capacitors containing dielectrics

UNIT III

MAGNETOSTATICS – Lorentz Law of force, magnetic field intensity – Biot–savart Law – Ampere's Law – Magnetic field due to straight conductors, circular loop – Magnetic flux density (B) – B in free space, conductor, magnetic materials – Magnetization – Magnetic field in multiple media – Boundary conditions– Magnetic force – Torque – Inductance – Energy density – Magnetic circuits. Susceptibility - permeability - intensity of magnetization

UNIT IV

CURRENT ELECTRICITY – EMF and Internal resistance of a cell - Cells connected in series and in parallel - Carey-Foster bridge - Potentiometer - Calibration of ammeter, high and low range Voltmeter, comparison of resistances.

UNIT V

ELECTROMAGNETIC INDUCTION - Faraday's and Lenz's law; motional e.m.f.- Self Induction-Mutual Induction- calculation of self and mutual inductance in simple cases-inductances in series and parallel- reciprocity theorem LR, CR and LCR circuits- transient and sinusoidal emf cases

TEXT BOOKS

1. Narayanamoorthi.M. and others - Electricity & Magnetism ,National Publishing Co., Chennai.

2. Murugesan.R. – Electricity & Magnetism -S. Chand & Company Ltd.

3. Brijlal and Subramanyam -Electricity & Magnetism- S.Chand & Company.

4. D.N. Vasudeva-Electricity and magnetism

BOOKS FOR REFERENCE

1. Sehgal and Chopra-Electricity & Magnetism

2. Halliday.D., Resnick.R. and Walker.J, Wiley, NY 1994.-Fundamentals of Physics.

3. CRC Hand book of Physics & Chemistry , 80th Ed, CRS Press, NY 1999.

WEBSITES

· Khan academy.org

· NPTEL

· www.ocw.mit.edu

· www.academic.earth

FOUNDATION COURSE II - NUMERICAL METHODS

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 3   **SEMESTER: III**

COURSE OBJECTIVES:

1. To identify and classify the numerical problem to be solved

2. To choose the most appropriate numerical method for its solution based on characteristics of the problem

3. To understand the characteristics of the method to correctly interpret the results

4. To understand the basic methods, algorithms and programming techniques to solve mathematical problems.

UNIT – I

INTERPOLATION – Newton's Forward and Backward formulae – Dividend differences and their properties, Stirling's and Bessel's formulae – Langrange's formula – simple problems.

UNIT – II

NUMERICAL INTEGRATION – General Quadrature formula – Trapizoidal rule, Simpson's 1/3 rule, Euler-Maclaurin's formula, Stirling's formula for factorial n – Summation of series by Euler – Maclaurin's formula.

UNIT – III

SOLUTIONS OF TRANSCENDENTAL AND POLYNOMIAL EQUATIONS IN ONE VARIABLE – Method of iteration – Newton-Raphson method – Regula Falsi method – Successive bisection method.

Solution of linear equation: Gauss reduction method – Exchange method – Jacobi iteration method – Gauss-Seidel method.

UNIT – IV

SOLUTIONS OF DIFFERENTIAL EQUATIONS - Numerical solution of ordinary differential equation of first order – Euler's method – Modified Euler's method – Picard's method of successive approximation – Runge-Kutta method (second and third order only).

UNIT – V

METHODS OF CURVE FITTING – Least square analysis – Matrix inversion – Gauss elimination method – Co-factor method – Partition method.

TEXT BOOKS

1. Numerical Methods in Science and Engineering – The National Publishing Co.Madras (2001).

2. Gupta B.D., Numerical Analysis, Konark Publishers Pvt. Ltd.

3. James Blaine Scarborough, Numerical Mathematical Analysis, Published by Oxford and IBH

REFERENCE BOOKS

1. Sastry S.S., (2003) 3rd Edition, Introductory Methods of Numerical analysis, Prentice – Hall of India, New Delhi
2. Saxena. H.C., The Calculus of finite differences and Mathematical Analysis, S. Chand.

3. Venkataraman. M.K. , Numerical Methods in Science and Engineering

WEBSITES

1. Khan academy.org

2. NPTEL

3. www.ocw.mit.edu

4. www.academic.earth

FOUNDATION COURSE III - PRINCIPLES OF COMMUNICATION

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75
CREDITS: 3	SEMESTER: IV	

COURSE OBJECTIVES:

1. To learn the basic principles of analog and digital communication systems.

2. To familiarize the student with modulation techniques.

3. To recognize and understand common modulation schemes for continuous wave modulation including amplitude modulation, frequency modulation, and phase modulation.

4. To recognize and understand common digital pulse modulation schemes including delta modulation and pulse-code modulation.

5. To understand the common analog pulse modulation schemes including pulse-amplitude modulation, pulse-width modulation, and pulse-position modulation.

UNIT I

INTRODUCTION TO FOURIER TRANSFORM - properties of Fourier Transform - Sampling theorem – Natural Sampling & Flat-top Sampling (Qualitative analysis)

UNIT II

AMPLITUDE MODULATION & DEMODULATION – Block diagram of Communication System – Types of Communication Systems – Need for Modulation – Amplitude Modulation – Definition & Representation – Generation of Amplitude Modulation (Balanced modulator) – Generation of SSB-SC AM (Frequency discriminator method) – Generation of VSB – Detector – AM demodulator – FDM

AM TRANSMITTER – Block diagram of AM Transmitter – definition of low level & high level modulation – Superheterodyne receiver – General Characteristics of receiver.

UNIT III

FREQUENCY MODULATION – Representation of FM – Generation of FM – Direct method (Varactor diode modulator) – indirect method (Armstrong method) – FM detection – slope detector – Foster seeley discriminator.

FM TRANSMITTER – Direct method & Armstrong method – FM super heterodyne receiver – Pre-emphasis & De-emphasis – Comparison of AM & FM -

UNIT IV

ANALOG PULSE CODE MODULATION - Generation & Detection of PAM, PWM & PPM.

DIGITAL PULSE MODULATION & DEMODULATION – PCM – Quantizing & Coding – Generation & Demodulation of PCM – Companding & encoding – Applications of PCM – Basic Concept of DM & ADM.

UNIT V

DIGITAL COMMUNICATION – TDM in PCM – Binary Systems – ASK – FSK and PSK – Detection of Digital Communication Signals. Introduction to FDM.

TEXT BOOKS

1. Kennedy, Electronic Communication System, McGraw-Hill Inter Student Edition.

2. Shanmugam, Sam K., Digital and Analog Communication System, John Willey.

3. Srinivasan. K.S., Digital Communication, Tata McGraw-Hill Education

1. Arokh Singh and Chhabra A.K. , Principles of Communication   Engineering – S. chand

2. Theraja . BL., Basic Electronics, S. chand

REFERENCE BOOKS

1. Venkatraman SK., Digital Communication, S. Chand

2. Roddy and Coolen, Communication electronics, PHI

3. Lathi B.P., Communication System, Wiley Eastern

4. Samshanmugam K., Digital and Analog Communication System, John Wiley

5. Robert M. Gaghardi, Satellite Communication, CBS Publication

6.   Taub and Shilling, Communication Systems, McGraw Hill.

7.   Carlson A.B., Communication Systems, McGraw Hill India.

8.   Chitode J.S., Principles of Digital Communication, (1st edition, 2008), Technical Publications Pune.

WEBSITES

1. Khan academy.org

2. NPTEL

3. http://www.electronicsteacher.com

4. http://www.abcofelectronics.com

5. www.ocw.mit.edu

6. www.academic.earth

FOUNDATION COURSE IV - PROGRAMMING IN 'C' & OOPS CONCEPT

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 40 EXTERNAL: 60

CREDITS: 3 **SEMESTER: IV**

COURSE OBJECTIVES:

1. To Understand how to use and manipulate variables and types to change the program state, including numeric, character, array and pointer types, as well as the use of structures and typedefs.

2. To understand the purpose and use of function libraries.

3. To understand the purpose of pointers for parameter passing, referencing and dereferencing, and linking data structures.

4. To understand object-oriented programming features in C++,

5. To understand the implementation of various data structures and algorithms in C++.

UNIT I

FUNDAMENTALS – Character set – Keywords – Identifiers – Data types – Constants Variables – Operators – Expression – Statements character I/O functions.

UNIT II

DECISION MAKING STATEMENTS – if-else – while – do-while – for – switch – break – continue – goto statements.

FUNCTIONS – Definitions – Arguments – Function prototype – Recursion – Library function.

UNIT III

ARRAYS – Array definition – Processing arrays – Passing array to a function – Multidimensional arrays – Strings – Storage classes.

POINTERS – Pointer declaration – Pointers and arrays – Pointer operation – Passing pointers to a function – Passing function to a function.

UNIT IV

STRUCTURES AND UNIONS – Structure definition – Processing a structure – Structures and Pointers – self-referential structures – Unions.

DATA FILES – Opening, closing, creating, Processing, data files – Register variables and bitwise operations – Command line parameters – C pre processors.

UNIT V

LIMITATION OF PROCEDURAL LANGUAGE – Characteristics of Object Oriented Language – Objects – Class – Inheritance – Reusability – Structure of C++ program – Polymorphism – Overloading – Applications of OOPS.

TEXT BOOKS

1. Balagurusamy E., "Programming in C", Tata McGraw Hill Publication

2. Herbert shield, The complete reference C ++ ,Tata McGraw Hill Publication.

3. Sourav Sahay, Object-Oriented Programming with **C++,** Oxford University Press, 2006.

REFERENCE BOOKS

1. Byron S Gottifried, Schaum's outline series, "Programming with C", Tata McGraw Hill Publication.

2. Mullish Cooper "The Spirit of C" , Schaum's outline series, Tata McGraw Hill Publication.

3. Yeswant Kanetkar , "Let Us C", BPB Publications.

4. Robert Lafore , Object Oriented Programming in-C++ , Techmedia Publication

WEBSITES

1. Khan academy.org

2. NPTEL

3. http://www.cprogramming.com

4. www.ocw.mit.edu

5. www.academic.earth

ELECTIVE - THEORY OF ROBOTICS AND AUTOMATION

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75
CREDITS: 4	SEMESTER: V or VI	

UNIT I

BASIC CONCEPTS – Origin & various generation of Robots - Robot definition - Robotics system components – Robot classification - Coordinate frames - Asimov's laws of robotics – degree of freedom – work volume - Need for Automation – types of automation – fixed, programmable and flexible automation.

UNIT I

SENSORS AND VISION SYSTEM – Sensing - Range, proximity, position, velocity, acceleration, Touch, Force, Torque. Optical & laser sensors.
MACHINE VISION- Introduction, Image acquisition, Illumination Techniques, Image conversion, Cameras, Image processing and analysis – image data reduction – segmentation feature extraction – Object recognition.

UNIT III

GRIPPERS AND ROBOT DYNAMICS – Introduction - various types of grippers-design considerations. Construction of Manipulator – Introduction to Robot-Dynamics – Lagrange formulation – Newton Euler formulation – Properties of robot dynamic equations.

UNIT IV

KINEMATICS AND PATH PLANNING – Forward Kinematics – Denavit Hartenberg Representation. Inverse Kinematics – Geometric approach.

UNIT V

PROGRAMMING LANGUAGES AND APPLICATIONS – Robot programming - Fixed instruction, sequence control, General programming language, Specific programming languages. Robots for welding, painting and assembly – Remote Controlled robots – Robots for nuclear, thermal and chemical plants.

TEXT BOOKS:

1. Mikell P. Groover, Weiss G.M. Nagel R.N. Odraj . N.G. , "Industrial Robotics", Tata Mc Graw Hill, 3rd Reprint, Edition 2008.
2. Deb.S.R. "Robotics Technology and flexible Automation", Tata Mc Graw Hill, 9th Reprint 2004.

3. K.S Fu, R C.Gonzalez, CSG Lee- "Robotics", McGraw Hill, Edition 2008.

REFERENCE BOOKS:

1. John J Craig "Introduction to Robotics Mechanics & control, Low price Edition, 7th Reprint, 2005.

2. Ghosh, "Control in Robotics and Automation : Sensor Based Integration", Allied Publishers.

WEBSITES:

1. Khan academy.org

2. NPTEL

3. http://www.electronicsteacher.com

4. http://www.abcofelectronics.com

5. www.ocw.mit.edu

6. www.academic.earth

ELECTIVE - INDUSTRIAL ELECTRONICS

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75
CREDITS: 4	**SEMESTER: VI**	

UNIT I

INDUSTRIAL ELECTRONIC DEVICES – Characteristics and applications of Thyratron, Ignitron, Thyristor, SCR and UJT – AC and DC switches – over voltage protection – flashers – static circuit breakers.

UNIT II

POWER SUPPLIERS – DC voltage regulators – different types of series voltage regulators – voltage and current regulation – controlled rectifiers and inverters – uninterruptible power supplies – Switched Mode Power Supply (SMPS).

UNIT III

MOTORS AND CONTROLS – DC motors – automatic regulation of speed and overload – reversing motors – AC motors – Induction motors – Speed control – Synchronous motors.

UNIT IV

WELDING AND HEATING – Principle and theory of induction heating – dielectric heating – resistance welding – Control Processes – Sequence timer – Synchronous Welding control – Temperature control circuits.

UNIT V

APPLICATIONS IN INDUSTRY – Relays and their characteristics and applications – Generation , Detection and Application of Ultrasonic's Application of LASER in industry.

BOOKS

4. M.G. Chute and R.D. Chute, Electronics and Industry –McGraw Hill Kogakusha.

5. C. Rai, Industrial and Power Electronics –Umesh Publications, New Delhi.

6. G.K. Mithal, Industrial Electronics –Khanna Publishers (14th Ed) New Delhi.
7. Noel Morris, Industrial Electronics –Tata McGraw Hill (II Edition).

WEBSITES:

1. Khan academy.org

2. NPTEL

3. http://www.electronicsteacher.com

4. http://www.abcofelectronics.com

5. www.ocw.mit.edu

6. www.academic.earth

ELECTIVE - MICROWAVE AND FIBER OPTIC COMMUNICATION SYSTEMS

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 4

SEMESTER: V or VI

COURSE OBJECTIVES:

1. To study the principles of generation, transmission and application of microwaves.

2. To explore the optical communication systems techniques and compare with other methods of transmission.
3. To study the properties and design of Oscillator and amplifier.

4. To understand the concepts of multi-mode and single-mode.

5. To understand how fiber-optic communication systems work.

6. To understand the applications of Radar.

UNIT I

INTRODUCTION TO MICROWAVES – Introduction – Maxwell's equation – Amperes law – Faradays law – Gauss law – Wave equation – Types of wave guides – TE and TM modes – Propagation of TM waves in rectangular wave guide – TM modes in rectangular wave guides.

UNIT II

MICROWAVE AMPLIFIERS AND OSCILLATORS – Microwave tubes: - Two cavity Klystron – Multi cavity Klystron – Reflex Klystron – Traveling wave tube (TWT) – Backward wave Oscillator (BWO) – Magnetron – Applications.

UNIT III

MICROWAVE DEVICES – Microwave transistors – Gallium Arsenide (GaAs) metal semi-conductor FET – Varactor Diode – PIN diode – Scotty diode – Tunnel diode – Gunn diode – IMPATT diode – TRAPATT diode – BARITT diode – Maser principle – Applications.

UNIT IV

RADAR – Introduction – Block diagram – Classification – Radar range equation – Factors affecting the range of a radar receivers – Line pulse modulator – PPI (Plane Position Indicator) – Moving Target Indicator (MTI) – FM CW Radar- Applications.

UNIT V

OPTICAL FIBER COMMUNICATION – A basic fiber optic system – Frequencies – Fiber optic Cables – Refraction – Numerical Aperture – Graded index cables – Single mode – Multi mode – Cable Constructions – Cable losses – Connectors – Light Sources – Light Detector – Systems Components – Advantages and Disadvantages.

BOOKS FOR STUDY AND REFERENCE:

1. Kennedy; Davis – "ELECTRONIC COMMUNICATION SYSTEMS" Tata McGraw Hill Publishing Company Limited, III edition.
2. Robert J Schoenbeck "ELECTRONIC COMMUNICATIONS MODULATION AND TRANSMISSION", PHI,1999
3. M.Kulkarni – "MICROWAVE AND RADAR ENGINEERING" Umesh Publications, 2nd edition.
4. Samuel Y.Liao – "MICROWAVE DEVICES AND CIRCUITS" PHI Private Limited, 2nd edition.
5. Anikh Singh – "PRINCIPLES OF COMMUNICATION ENGINEERING" S.Chand & Company Limited, 2nd Edition.

WEBSITES:

- Khan academy.org
- NPTEL
- http://www.electronicsteacher.com
- http://www.science-ebooks.com

- http://www.abcofelectronics.com

ELECTIVE - MOBILE COMMUNICATION

SUBJECT CODE:	THEORY	MARKS: 100
		INTERNAL: 25
		EXTERNAL: 75

CREDITS: 4

SEMESTER:V or VI

UNIT I

CELLULAR MOBILE RADIO SYSTEMS AND ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN

– Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems, General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

UNIT II

INTERFERENCE AND CELL COVERAGE FOR SIGNAL AND TRAFFIC – Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co channel interference-different types, Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

UNIT III

CELL SITE AND MOBILE ANTENNAS, FREQUENCY MANAGEMENT, CHANNEL ASSIGNMENT, HANDOFF – Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas, Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment, Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

UNIT IV

WIRELESS SYSTEMS AND STANDARDS AND DIGITAL CELLULAR NETWORKS – Second generation and Third generation Wireless Networks and Standards, WLL, Bluetooth, GSM, IS-95, DECT, GSM architecture, GSM channels, multiplex access scheme, TDMA, CDMA.

UNIT V

INTELLIGENT NETWORK FOR WIRELESS COMMUNICATIONS – Intelligent Cell Concept, Advanced Intelligent Network, SS7 Network and ISDN for AIN, AIN for Mobile communication, Asynchronous Transfer Mode Technology, Future Public Land Mobile Telecommunication System, Wireless Information Superhighway.

BOOKS

1. W.C.Y. Lee, "Mobile Cellular Telecommunications", 2nd Edition, Tata McGraw Hill, 2006.

2. Gordon L. Stuber, "Principles of Mobile Communications", 2nd Edition, Springer International, 2007.

3. Theodore. S. Rapport, "Wireless Communications", 3rd Edition, Pearson Education, 2003.

4. Lee, "Wireless and Mobile Communications", 3rd Edition, McGraw Hill, 2006.

5. Jon W. Mark and Weihua Zhqung, "Wireless Communication and Networking", PHI, 2005.

6. R. Blake, "Wireless Communication Technology", Thompson Asia Pvt. Ltd., 2004.

WEBSITES:

1. Khan academy.org

2. NPTEL

3. http://www.electronicsteacher.com

4. http://www.abcofelectronics.com

5. www.ocw.mit.edu

6. www.academic.earth

ELECTIVE – MEDICAL ELECTRONICS

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75
CREDITS: 4	**SEMESTER:V or VI**	

UNIT-1

BIO-AMPLIFIERS : Bio potentials - bio - electricity, Necessity for special types of amplifiers for biological signal amplifications - different types of Bio-OP-AMPS.

UNIT-2

BIO-POTENTIAL RECORDING : ECG - EEG - EMG - ERG - Specific types of electrodes used - different lead systems - their waveforms.

UNIT-3

MEASUREMENT OF BIOLOGICAL PARAMETERS -Measurement of respiration rate - measurement of heart beat rate - measurement of temperature - measurement of blood pressure - patient monitoring set up - blood flow meters EM and plesthsmographic technique.

UNIT-4

HIGH ENERGY RADIATION APPLICATIONS : Applications of X-ray and isotopes for diagnostics and therapeutic applications - application of Lasers in biological medium.

UNIT-5

HIGH FREQUENCY APPLICATIONS : Diathermy effect - Short wave diathermy - UltrasOnic diathermy - Microwave diathermy.

BOOKS FOR STUDY AND REFERENCE

1. Clinical Engineering - Jacobster and Webster, PHI.

2. Applied Biomedical Instrumentation - Geddes and Baker, John Wiley & Sons.

3. Biomedical Instrumentation - M.Arumugham, Anuraçlha Agencies Publishers (II Edition)

WEBSITES

1. Khan academy.org

2. NPTEL

3. http://www.electronicsteacher.com

4. http://www.abcofelectronics.com

5. www.ocw.mit.edu

6. www.academic.earth

ELECTIVE - CONSUMER ELECTRONICS

SUBJECT CODE:	THEORY	MARKS: 100 INTERNAL: 25 EXTERNAL: 75

CREDITS: 4

SEMESTER: V or VI

UNIT-I

MICROWAVE OVENS – Microwaves (Range used in Microwaves Ovens) - Microwave oven block diagram - LCD timer with alarm – Single-Chip Controllers – Types of Microwave oven - Wiring and Safety instructions - Care and Cleaning.

UNIT-II

WASHING MACHINES – Electronic controller for washing machines - Washing machine hardware and software - Types of washing machines - Fuzzy logic washing machines - Features of washing machines.

UNIT-III

AIR CONDITIONERS AND REFRIGERATORS – Air Conditioning - Components of air conditioning systems -

All water air conditioning systems - All air conditioning systems - Unitary and central air conditioning systems -

Split air conditioners.

UNIT-IV

HOME / OFFICE DIGITAL DEVICES – Facsimile machine - Xerographic copier - Calculators - Structure of a calculator - Internal Organization of a calculators - Servicing electronic calculators - Digital clocks - Block diagram of a digital clock.

UNIT-V

DIGITAL ACCESS DEVICES – Digital computer - Internet access - Online ticket reservation - Functions and networks - Barcode Scanner and decoder - Electronic Fund Transfer - Automated Teller Machines (ATMs) - Set-Top boxes - Digital cable TV - Video on demand.

BOOKS

1. S.P. Bali, Consumer Electronic - Pearson Education, New Delhi, 2005.

WEBSITES:

· Khan academy.org

· NPTEL

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