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**TOTAL:** 180 140 3800
GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS – I SEMESTER – CORE COURSE – I
(For the candidates admitted from 2011-12 onwards)

PROPERTIES OF MATTER AND ACOUSTICS

UNIT – I : Elasticity -I

UNIT – II : Elasticity -II
Expression for bending moment- Cantilever- Expression for depression - Experiment to find Young’s modulus - Cantilever oscillation – Expression for period – Uniform Bending – Expression for Elevation – Experiment to find Young’s modulus using pin and microscope – Non Uniform Bending – Expression for depression – Experiment to determine Young’s modulus using mirror and telescope.

UNIT -III Surface Tension
Definition and dimensions of Surface Tension – Excess of pressure inside a drop and bubble - Excess of pressure inside a over curved surface – Angle of contact - Jaeger’s ‘method - Determination of surface tension by Drop weight method - Variation of surface tension with temperature– Formation of drops

UNIT – IV Viscosity

UNIT – V Acoustics

Books for study
1. Properties of Matter - Brijlal and Subramaniyam
3. Text Book of Sound - Brijlal and Subramaniyam
4. Properties of Matter - D.S. Mathur

Books for References:
2. Oscillations, waves and sound – L.P. Sharma and H.C. Saxena

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UNIT – I  Mechanics:
Centre of Gravity – Centre of gravity of a solid hemisphere – Hollow hemisphere and Solid cone. – Stability of Floating Bodies: Meta centre – Determination of meta centric height of a ship.

UNIT – II  Sound:
Simple Harmonic Motion – Composition of two simple harmonic motion - Along a Straight Line - At right angles to each other – Lissajou’s figures and their applications – Characteristics of sound – Classifications of musical sound – Decibel – Loudness – Weber- Fechner law – Reverberation and reverberation time – Sabine’s formula for reverberation time – Acoustics of buildings

UNIT – III  Properties of Matter:

UNIT IV  THERMAL PHYSICS

UNIT V  OPTICS
Electromagnetic spectrum- Spectral response of human eye-UV and IR Spectroscopy – Raman effect – Experimental arrangement – Applications of Raman effect

Books for study
1. Allied Physics I & II - R.Murugeasan
2. Allied Physics I – A.Sundaravelusamy

Books for Reference
1. Mechanics I & II – Narayananamoorthy
2. Heat and thermodynamics - Brijlal and Subramaniyam
3. Optics - Brijlal and Subramaniyam

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS – I & II - SEMESTER – CORE COURSE – II
(For the candidates admitted from 2011-12 onwards)

CORE PRACTICAL – I

1. Young’s Modulus – Non Uniform Bending – Pin and Microscope.
2. Young’s Modulus – Uniform Bending - Optic lever method.
4. Compound Pendulum – g and K
5. Surface tension and Interfacial surface tension of the given liquid – Drop weight method.
6. Sonometer verification of laws of transverse vibrations and determination of frequency of a tuning fork.
7. Sonometer – AC frequency.
8. Melde’s Experiments.
10. Thermal Conductivity of bad conductor – Lee’s disc method.
12. Long Focus Concave Lens – f, R and μ.
14. Meter Bridge- Specific resistance.
15. P.O. Box – Temperature Co efficient of resistance.

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COE
1. Young’s Modulus – Non Uniform Bending – Pin and Microscope.
2. Surface tension and Interfacial Surface tension – Drop weight method.
3. Coefficient of Viscosity of liquid using graduated burette.
4. Specific heat capacity of liquid by cooling method.
6. Spectrometer – Grating – Normal incidence method
7. Spectrometer – refractive index of solid prism (A,D and μ)
8. Newton’s Ring – Radius of curvature of a convex lens
10. Carey Foster’s bridge – specific resistance.
11. Meter bridge – Determination of specific resistance
12. EMF of thermocouple – Direct deflection method.
15. AND, OR and NOT Logic gates - Verification of truth table using discrete Components.

Books for reference

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., PHYSICS - II SEMESTER – CORE COURSE III

(For the candidates admitted from 2011-12 onwards)

MECHANICS AND RELATIVITY


UNIT – II  Dynamics of Rigid Bodies: Kinetic energy of rotation – Theory of Compound Pendulum – Equivalent simple pendulum – Reversibility of centers of oscillation and suspension – Determination of g and radius of gyration of a bar pendulum – Moment of Inertia – M.I of a solid and Hollow Sphere-Hemisphere


Text Book:


Reference:


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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05

B.Sc - III SEMESTER- FIRST ALLIED COURSE-III
(For CHEMISTRY AND MATHEMATICS MAJOR)
(For the candidates admitted from 2011 – 12 onwards)

ALLIED PHYSICS –III

UNIT – I  Electrostatics

UNIT – II  Electricity

UNIT – III  Atomic Physics
Atom models – Sommerfeld’s and Vector atom models – Pauli’s exclusion principle – Various quantum numbers and quantization of orbits X- rays – Continuous and Characteristic of X-rays – Mosley’s law and its importance – Bragg’s law – Miller Indices – Determination of crystal structure by Laue’s powder photograph method.

UNIT – IV  Nuclear Physics
Nucleus – Nuclear Size – Charge – Mass and Spin – Liquid drop and shell models-Nuclear radiations and their properties – Particle accelerators – Betatron and Proton – Synchrotron, Particle Detectors – Cloud chamber and Bubble Chambers.

UNIT – V  Digital Electronics
Digital Electronics – Decimal - Binary – Octal and Hexa Decimal Number Systems and their Mutual Conversions – 1’s and 2’s Compliment of a Binary Arithmetic (addition, subtraction, multiplication and division) – Binary subtraction by 1’s and 2’s complement methods - Basic Logic gates AND, OR, NOT, NOR, NAND, and EX-OR gates – NAND and NOR as Universal building gates – Boolean Algebra – De Morgan’s theorems – Their verifications using truth tables.

Books for Study:
1. Allied Physics I & II – R. Murugesan
2. Allied Physics II – A. Sundaravelusamy

Books for Reference:
3. Electricity and magnetism – Brijlal and Subramanian
4. Modern Physics – R. Murugasan

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COE
UNIT I  Heat

UNIT II Thermodynamics

UNIT III Heat Engines

UNIT IV Low Temperature Physics

Unit – V Statistical Physics

Text:
1. Heat and Thermodynamics – J.B Rajan and C.L Arora
2. Heat Thermodynamics – Brijlal and Subramaniam

Reference:
1. Thermodynamics and Statistical Physics – Sharma and Shankar
2. Statistical Mechanics – Satya Prakash and C.A Agarwal

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B.Sc., - III SEMESTER – NON CORE ELECTIVE – I

(For CHEMISTRY MAJOR)

(For the candidates admitted from the year 2011 -12 onwards)

ENERGY PHYSICS - I


Text Books


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COE
UNIT – I

UNIT – II

UNIT – III

UNIT – IV

UNIT – V

Book for study
2. Applied of Physics – I – A. Sundaravelusami

Book for References
1. Electricity and Magnetism – Narayanamurthy and Nagarathinam.
GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05

B.SC ., PHYSICS –IV - SEMSTER – CORE COURSE –V

(For the candidates admitted from 2011-12 onwards)

CORE PRACTICAL – II

(Any 14 experiments only)

1. Co-efficient of viscosity of the given liquid – Poiseuille’s flow method
2. Temperature of coefficient of resistance – Potentiometer
3. Specific heat capacity of a liquid – Joule’s calorimeter
4. Emissive power of a surface – spherical calorimeter
5. Potentiometer – calibration of ammeter
6. Figure of merit[ current sensitivity and voltage sensitivity] - mirror galvanometer
7. Refractive index of liquid prism – spectrometer
8. Zener controlled voltage regulator
9. Rigidity modulus – Static Torsion
10. Emissive power of a surface – Spherical calorimeter
11. Resistance and specific resistance – Carey foster bridge
12. Logic gates [ using discrete components ] – AND , OR & NOT
13. Transistor characteristics – CE Configuration
14. Rigidity modulus of the given wire – Torsion pendulum
15. Spectrometer – i-d curve
16. Determination of rigidity modulus of the given rod – Static torsion
17. Kund’s tube- Young’s modulus of the material of the rod
18. Stroke’s method – Viscosity of highly viscous liquid
19. CRO study of wave forms – Lissajou’s figures – f determination.

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COE
OFFICE AUTOMATION LAB

MS-WORD

a) Text manipulation

1. Change the font size and type
2. Aligning and justification of text
3. Underlining the text
4. Indenting the text
   - Preparing a bio-data
   - Prepare a letter

b) Usage of numbering, Bullets, Footer and Headers

Usages of Spell check and find & Replace
1. Prepare a document in newspaper format
2. Prepare a document with bullets, footer & headers

c) Tables and manipulation

a. Creation, Insertion, Deletion (Columns and rows) and usage of Auto format.
   - Create a Mark Sheet using Table and find out the total marks.

b. Picture insertion and alignment

   Prepare a greeting card

c. Creation of document using templates

   i. Prepare a letter using the template
   ii. Prepare a bio-data using various kinds of templates

d. Mail Merge Concepts

   Prepare an invitation to be sent to specific addresses, in the data source
MS- EXCEL
CELL EDITING

1. Describe the types of functions
2. File Manipulations
3. Data sorting- Ascending and Descending (both numbers and alphabets)
4. Worksheet preparation
5. Marklist preparation for a student
6. Electricity bill preparation
7. Inventory Report preparation
8. Invoice report preparation
9. Drawing graphs

MS-POWERPOINT

a) Insert Clip and Pictures
   Frame movements of the above
   1) Create a slide show presentation for a seminar (Choose your own topic)
   2) Create non-bulleted and bulleted body text
   3) Apply the appropriate text attributes

b) Insertion of new slides
   Preparation Organization Charts.
   1) Create a slide preparation for an invitation
      a. Insert an object from a bitmap file
      b. Enter the text in the slide view
      c. Apply appropriate text attribute
      d. Rotate the object to 45 degree (approximately)
      e. Apply shadow to the object

c) Preparation using wizards
   Using of design templates
   Create a slide show presentation to display percentage of marks in each semester
   for all students.
   a. Use bar chart (X-axis: Semester, Y-axis: % marks)
   b. Use different presentation template and different transition effect for each
      slide.
   c. Use different text attribute in each slide.
GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05
B.Sc., – IV SEMESTER – SECOND ALLIED COURSE – II
(FOR COMPUTER SCIENCE MAJOR)
(For the candidates admitted from 2011-12 onwards)

APPLIED PHYSICS – II - LAB

1. Semi conductor diode – Characteristics.
2. Zener Diode – Characteristics.
3. FET – Characteristics.
5. Transistor Characteristics – CB Configuration.
6. Bridge Rectifier and Zener controlled regulated power supply
7. Field along the axis of a coil – M
10. Carey Foster’s Bridge – Specific resistance
13. RC Coupled amplifier.
14. FET amplifier.
15. Astable multivibrator.
17. Field along the axis of a coil – Determination of BH value.

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B.Sc., PHYSICS – IV SEMESTER – CORE COURSE – VI
(For the candidates admitted from 2011-12 onwards)

OPTICS

UNIT -I Lens Aberration

UNIT –II Optical Instruments

UNIT III Interference

UNIT –IV Diffraction

UNIT V Polarization
Nicol Prism as an analyzer and polarizer – Huygen’s explanation of double refraction in uniaxial crystals – Quarter wave plate and half wave plate –Babinets compensator –Optical activity – Fresnel’s explanation of optical activity – Laurent’s Half shade polarimeter.

Books for study
1. Optics by Brijilal and Subramaniyam

Books for References
2. Optics – Ajoy Chatak (TMH) - Delhi

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., – IV SEMESTER – NON CORE ELECTIVE – II

(FOR CHEMISTRY MAJOR)

(For the candidates admitted from 2011-12 onwards)

ENERGY PHYSICS - II

UNIT- I Biomass Energy

UNIT- II Other Energy Sources

UNIT-III Nuclear Power

UNIT-IV Energy Storage
Conservations of Energy – Patterns of Energy Consumption in Domestic, Industrial, Transporation and Agricultural Sectors – Conservation Principles in these Sectors

UNIT-V Impacts Of Non – Conventional Energy
Energy Crisis and Possible Solutions – Energy Option for the Developing Countries – Impacts Due to Non – Conventional Energy Sources – Global Warming.

References:

2. Wheare, K.C: Modern Constitution.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR -05  
B.SC., - IV SEMESTER – SECOND ALLIEDCOURSE – III  
(FOR COMPUTER SCIENCE MAJOR)  
(For the candidates admitted from 2011-12 onwards)  

APPLIED PHYSICS III  

UNIT –I  

UNIT – II  

UNIT – III  

UNIT – IV  

UNIT – V  

Book for study  

1. Applied Physics by A. Sundaravelusamy.  

Book for References  

2. The fundamentals of solid state physics – Theraja, Sultan chand & Co.  
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B.Sc., PHYSICS- V SEMESTER-CORE COURSE VII
(For the candidates admitted from 2011-2012 onwards)

ELECTRICITY AND MAGNETISM.

UNIT-I Electrostatics:

UNIT-II Magnetic Properties of Material:

UNIT-III Chemical Effects of Electric Current:

UNIT-IV Electromagnetic Induction:

UNIT-V CIRCUIT THEORY:

Text Book:
1. Electricity And Magnetism- R.Murugasan
Reference Book:
1. Electricity and Magnetism – Brijlal and Subramaniyam
2. Electricity and Magnetism- Tiwari

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UNIT-I Positive ray analysis:
Properties of positive rays-e/m Thomson’s method - Parabola method-Aston’s and Bain’s bridge Mass spectrometer-Determination of critical potential-Franck and Hertz’s experiment.

UNIT-II Photo Electricity:
Photoelectric emission- Laws - Lenard’s experiment- Richardson & Compton experiments- Einstein’s photoelectric equation-Experimental verification of Einstein’s photoelectric equation by Millikan’s experiment.

UNIT-III Vector Atom Model:
Various quantum numbers, L-S and j-j couplings- Pauli’s exclusion principle- Electronic configuration of elements and periodic classification- Magnetic dipole moments of electron due to orbital and spin motion- Bohr magnetron- Stern and Gerlach experiment.

UNIT-IV Fine Structure of spectral Lines:
Spectral terms and notations- Selection rules- Intensity rule an interval rule- Fine structure of Sodium D lines- Alkali Spectra- Fine structure in Alkali spectra- Spectrum of Helium- -Larmor’s theorem- Debye’s quantum mechanical explanations - Zeeman effect- Normal Zeeman effect- Anomalous Zeeman effect- Theoretical explanation, Lande’s ‘g’ factor and explanation of splitting of D1 and D2 lines of sodium.

UNIT-V X Rays:

Books for Study:
1. Modern Physics by R.Murugeshan.

Reference:
1. Modern Physics by J.P Rajan

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UNIT-I  SEMICONDUCTOR DEVICES:

UNIT-II  Bipolar Junction Transistor:

UNIT-III  Special Semi Conductor Devices:
FET – JFET – MOSFET – FET parameter – Comparison between FET and Transistor – Photo Transistor – Characteristics of SCR & UJT – Application of SCR as a switch and UJT as a relaxation oscillator.

UNIT-IV  Amplifiers and Oscillators:

UNIT-V  Opto-electronics Devices:

References:
2. Elements of Electronics – Anand Prakash, Chopra and segal – S.Chand and Co.
6. Integrated Electronics – Mill Man Halkias - TMH

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UNIT-I Microwave Spectroscopy:
Introduction to EM radiation-The rotation of molecules, its spectra, Diatomic Molecules-Rigid diatomic molecule-Intensities of spectral lines-Effect of isotopic substitution-Non rigid, rotator its spectrum- Techniques and Instrumentation of Microwave Spectroscopy.

UNIT-II Spectroscopy:

UNIT-III Raman Spectroscopy:

UNIT-IV Laser Physics:
Introduction – Principle of Spontaneous emission and stimulated emission.-Population inversion, pumping. - Derivation of Einstein’s A and B coefficients. -Types of lasers – He-Ne, CO2 , Nd-YAG and semiconductor laser (homojunction & heterojunction) qualitative

UNIT-V Applications of Laser
Applications of laser in materials processing - Lasers in welding, drilling, heat treatment, cutting – Medical applications - Holography (construction & reconstruction).-Applications -LIDAR

Reference Books:
2. Lasers and non linear optics, B.B.Laud Wiley Eastern Ltd.,(1985)
GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., PHYSICS-V- SEMESTER-SKILL BASED ELECTIVE-II

(For the candidates admitted from 2011-2012 onwards)

SURFACE MOUNT TECHNOLOGY LAB

1. SMT. Package and soldering fundamentals drawing.
   i) Surface mounting Vs Hole Mounting.
   ii) Differentiate b/w Ic-chip and Ic Package-40 pin DIP.

2. SMT Assembly
   a) Overview of solder paste.
   b) Overview of components placement process.
   c) Overview of solder paste depression process.

3. Solder paste on PCB pad.
   Time Vs Temperature profile of a solder joint types of SMT PCB AND then assembly process.

4. Overview of Pasting.
   Types of faults encountered in PCB diagnostic.

5. PCB Design

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B.Sc., PHYSICS-V- SEMESTER-SKILL BASED ELECTIVE-III

(For the candidates admitted from 2011-2012 onwards)

ELECTRIC WIRING AND WINDING LAB

1. Control of a lamp throw 2-way switch.
2. Two lamps dimmer
4. Parallel control of 2-lamps.
5. Control of 2-lamps with two switches and a 3-pin wall socket.
7. Estimations for a small pump house.
8. Estimation for a small house PVC WIRING.
9. Street lighting.
11. Designing of winding of a Transformer(230V, 12V-0-12V with 5 Amps)
12. Winding of a no volt coil for a direct OV line starter.

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GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05

B.Sc., PHYSICS -VI - SEMESTER – CORE COURSE – X
(For the candidates admitted from 2011-2012 onwards)

CORE PRACTICAL-III

Section-A-General
(Any 12 Experiments only)

1. Koenig’s Method-Uniform Bending-Y
2. Spectrometer i-I Curve.
4. Spectrometer-Grating minimum deviation and dispersive power.
5. Spectrometer-dispersive power of a given prism.
7. Spectrometer Fraunhofer lines
8. Spectrometer-Hartmann’s Formula
9. Field along the axis of a coil-Determination of M
10. M and H absolute determination using deflection and vibration magnetometer.
11. Potentiometer-EMF of a thermocouple
13. Potentiometer-High range voltmeter calibration.
14. Ballistic Galvanometer –Figure of merit.
15. B.G.Absolute capacity of condenser.
16. B.G.-Absolute L
17. B.G.-Absolute M
18. Anderson’s bridge- AC self inductance of a coil.

Section-B Using C language.
(Any three Experiments only)

19. Arranging words in alphabetical order.
20. Picking the largest and smallest of a set of numbers.
22. Multiplication of two square matrices.
23. Integration-Simpson’s rule/Trapezoidal method.
25. Convert Celsius to Fahrenheit/Fahrenheit to Celsius
GOVERNMENT ARTS COLLEGE (AUTONOMOUS) KARUR-05
B.Sc., PHYSICS- VI - SEMESTER-CORE COURSE -XI
(For the candidates admitted from 2011-2012 onwards)

CORE PRACTICAL - IV

Section-A-ELECTRONICS
(Any 12 experiments only)

1. Series and Parallel resonance circuits(CRO can be used)
2. Single Stage-RC couples amplifier-Transistor.
3. Emitter follower amplifier-Frequency response.
5. Colpitt’s Oscillator.
6. Astable Multivibrator.
7. FET Characteristics.
8. FET amplifier.
9. Verification of Logic Gates-AND, OR, NOT, NAND, NOR and EXOR using Ic’s-Truth Table
10. Universal Gates NAND/NOR and basic gates from Universal gates.
12. Demorgan’s theorem and Boolean Algebra.
13. OP-Amp- integrated and Differentiator.

Section-B-Microprocessor 8085(Any 3 only)

15. 8-Bit Addition and Subtraction.
16. 8-bit Multiplication and Division.
17. Conversion from decimal to hexadecimal system.
18. Conversion from hexadecimal to decimal system.
19. Sum of N number.

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B.Sc., PHYSICS – VI SEMESTER – CORE COURSE - XII

(For the candidates admitted from 2011-12 onwards)

SOLID STATE PHYSICS

UNIT- I  Crystal Structure:

UNIT- II  X-Ray Diffraction:

UNIT-III  Theory of Magnetism :
Different types of magnetic materials – Classical theory of dia and para magnetism – Quantum theory of Para magnetism – Quantum theory of ferromagnetism (Heissenberg’s model) – Anti Ferromagnetism and ferri magnetism.

UNIT-IV  Di – Electrics :
Basic definition in Dielectrics – Different types of polarization - Frequency and temperature effects on polarization – Dielectric loss – Local field on internal field – Clausius – Mosotti relation – Determination of Dielectric constant.

UNIT-V  Super Conductivity:

References:
1. Introduction to Solid State Physics – C.Kittel Willey and sons
2. Solid State Physics – S.O.Pillai
4. Material Science – Arumugam

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B.Sc., PHYSICS – VI SEMESTER – CORE COURSE - XIII

(For the candidates admitted from 2011-2012 onwards)

WAVE MECHANICS AND NUCLEAR PHYSICS

UNIT- I  Introduction

UNIT- II  Dual Nature of Matter

UNIT-III  Schrodinger’s Wave Equation

UNIT-IV  Basic Nuclear Properties

UNIT-V  Nuclear Reactions and Elementary Particles

Reference Books:


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INTEGRATED ELECTRONICS

UNIT – I  Basic Operational Amplifier:

Basic Uses of Operational Amplifier:
Operational amplifier as sign and scale changer and phase shifter-Adder- Subtractors -Integrator - differentiator-D/A converter-A/D/ Converter-Operational Amplifier as a comparator.

UNIT-II Binary Logic:
Number system and logic gates- Boolean function- Complement of a function- Synthesis of Boolean function- Simplification of Boolean function-Karnaugh map (upto ‘4’ variables) - Sum of products and product of sum simplifications.

UNIT-III Combinational and Sequential Logic Circuits:

UNIT-IV Fabrication Of Integrated Circuits:

UNIT-V Microprocessor:
Introduction-Architecture of 8085-Memory organization-Register Structures-Addressing modes-Instruction set-Programming for addition-Subtraction-BCD addition-Greatest number and smallest number-sum of series.

References:
1. Interegrated Electronics- Mill Man Hakins –TMH
2. Fundamentals of Digital Electronics – Mavino and Leach
3. Microprocessor – B. Ram

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UNIT- I  Curve Fitting:  
Principle of Least Squares – Method of Group Averages – Fitting a Straight Line Linear Regression – Fitting a Parabola Fitting an Exponential Curve.

UNIT- II  Solution Of Numerical Algebraic, Transcendental And Differential Equation:  

UNIT-III  Simultaneous Linear Algebraic Equation:  

UNIT-IV  Interpolation:  
Linear Interpolation: Newton Forward Interpolation Formula and Backward Interpolation Formula. Interpolation with Unequal Intervals: Lagrange’s Interpolation Formula (No Derivation) Hermite’s – Bessel’s Interpolating Polynomials.

UNIT-V  Numerical Integration:  

Text book: