E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

(*An Autonomous Institution – Affiliated to Madurai Kamaraj University*)

Re-accredited (**3rd Cycle**) with Grade **A+** & **CGPA 3.51** by NAAC

DEPARTMENT OF PHYSICS

CBCS SYLLABUS

BACHELOR OF SCIENCE

PROGRAMME CODE - P

COURSE STRUCTURE

(w.e.f. 2017 – 2018 onwards)

Annexure -12

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI -14.

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CBCS

DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

COURSE STRUCTURE-SEMESTER WISE

Sem	Part	Subject code	Title of the paper	Teaching hrs.(Per week)	Duration of exam (hrs)	Marks allotted			Credits
						C.A	S.E	Total	
1	I	171T1	Part –I Tamil	6	3	25	75	100	3
	II	172E1	Part-II English	6	3	25	75	100	3
	III	17P11	Core – Mechanics, properties of matter and sound	4	3	25	75	100	4
		17P1P	Core - Major Practical – I	2	-	-	-	-	-
		17AM1	Allied 1 - Mathematics – I	6	3	25	75	100	4
	IV	17SEP11	Basic electronics	2	2	25	75	100	2
		17SEP12	Digital Electronics	2	2	25	75	100	2
		17NMP1	Energy Physics	2	2	25	75	100	2
2	I	171T2	Part –I Tamil	6	3	25	75	100	3
	II	172E2	Part-II English	6	3	25	75	100	3
	III	17P21	Core – Heat and Thermodynamics	4	3	25	75	100	4
		17P2P	Core - Major Practical – I	2	3	40	60	100	3
		17AM2	Allied 1- Mathematics – II	6	3	25	75	100	5
	IV	17SEP21	Electronic Instrumentation	2	2	25	75	100	2
		17SEP22	Electricity	2	2	25	75	100	2
		17NMP2	Astro Physics	2	2	25	75	100	2
3	I	171T3	Part-I Tamil	6	3	25	75	100	3
	II	172E3	Part-II English	6	3	25	75	100	3
	III	17P31	Core – Electro Magnetism	4	3	25	75	100	4
		17P4P	Core - Major Practical - II	2	-	-	-	-	-

		17AM3	Allied 1 - Mathematics – III	6	3	25	75	100	4
		17AKP3	Allied 2- Physical Chemistry	4	3	25	75	100	4
		17AKP4P	Allied 2 Practical I-Qualitative Analysis	2	-	-	-	-	-
4	I	171T4	Part-I Tamil	6	3	25	75	100	3
	II	172E4	Part-II English	6	3	25	75	100	3
	III	17P41	Core – Optics	4	3	25	75	100	4
		17P4P	Core - Major Practical – II	2	3	40	60	100	3
		17AM4	Allied 1 - Mathematics – IV	6	3	25	75	100	5
		17AKP4	Allied 2-Organic and Physical chemistry	4	3	25	75	100	4
		17AKP4P	Allied 2 Practical I-Qualitative Analysis	2	3	40	60	100	1
5	III	17P51	Core – Atomic and Nuclear Physics	4	3	25	75	100	4
	III	17P52	Core –Programming with C++	4	3	25	75	100	4
	III		**Core - Elective –I**	4	3	25	75	100	4
		17P61P	Core - Major Physics Practical – III	3	-	-	-	-	-
		17P62P	Core - Major Electronics Practical – IV	3	-	-	-	-	-
		17PPR6	Major Elective –Project	2	-	-	-	-	-
		17AKP5	Allied 2- Inorganic, Physical and Medicinal Chemistry	4	3	25	75	100	4
		17AKP6P	Allied 2 Practical II-Volumetric Analysis	2	-	-	-	-	-
	IV	17SEP51	Fibre optic communication	2	2	-	-	100	2
		174EV5	Environmental studies	2	2	-	-	100	2
6	III	17P61	Core - Solid State Physics	4	3	25	75	100	4
	III	17P62	Core – Spectroscopy	4	3	25	75	100	4
	III		**Core - Elective –II**	4	3	25	75	100	4
		17P61P	Core - Major Physics Practical – III	3	3	40	60	100	5
		17P62P	Core - Major Electronics Practical – IV	3	3	40	60	100	5
		17PPR6	**Core- Elective-III Project**	2	3	20	80	100	3
		17AKP6	Allied 2- Analytical and Inorganic Chemistry	4	3	25	75	100	4
		17AKP6P	Allied 2 Practical II-Volumetric Analysis	2	3	40	60	100	1
	IV	17SEP61	Introduction to Microcontrollers 8051	2	2	-	-	100	2
		174VE6	Value education	2	2	-	-	100	2
	V	175NS4/ 175PE4	Extension Activities NSS/Phy. Education	-	2	-	-	100	1
			Total	180					140

Electives

Semester V (Elective I- Choose any one)

1. Electronics - 17PE5A
2. Numerical methods - 17PE5B

Semester VI (Elective II- Choose any one)

1. Theoretical Physics -17PE6A
2. Applications of Electronic Devices and Instrumentation -17PE6B

Elective-III Project -17PPR6

Allied – Physics for Maths/Chemistry Students
CBCS

Class	Sem	Sub Code	Title of the paper	Teaching hrs(Per week)	Duration Of exam (hrs)	Marks allotted			
						C. A	S.E	Total	Credits
I Maths/ II Chemistry	I/III	17AP1	Mechanics, Properties of Matter and sound	4	3	25	75	100	4
		17AP2P	Allied - Physics Practical-I	2	-	-	-	-	-
I Maths/II Chemistry	II/IV	17AP2	Thermal Physics	4	3	25	75	100	4
		17AP2P	Allied - Physics Practical-I	2	3	40	60	100	1
IIMaths/ III Chemistry	III/V	17AP3	Electricity and Electronics	4	3	25	75	100	4
		17AP4P	Allied - Physics Practical-II	2	-	-	-	-	-
II Maths/III Chemistry	IV/VI	17AP4	Optics	4	3	25	75	100	4
		17AP4P	Allied - Physics Practical-II	2	3	40	60	100	1

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DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Title of the Paper : Mechanics, Properties of matter and Sound
Semester : I **Contact Hours : 4**
Subject Code : 17P11 **Credits : 4**

Objectives:

To familiarize the students with

1. Concepts of Mechanics and Dynamics of objects.
2. Laws of gravitation, Viscosity and Elasticity.
3. Properties of Sound.

Unit : I Mechanics-Significance of Conservation laws-Concepts of work, power and energy-Conservative forces-Energy- Conservation of linear momentum-Collision—Calculation of final velocities of colliding particles(one dimension only)-Systems of variable mass-The Rocket.

Unit: II Dynamics of Rigid Bodies-Rigid body –Torque-Angular momentum-Moment of inertia(Radius of Gyration)–General theorems of moment of inertia-Particular cases of moment of inertia(circular disc, circular ring, solid cylinder, solid sphere, hollow sphere).

Unit :III Gravitation-Newton's law of gravitation-Experimental determination of gravitational constant (G) using Boy's method- Kepler's laws -Compound pendulum(to find value of g and T using bar pendulum)

Viscosity- Newton's law of viscous flow-Coefficient of viscosity- Equation of continuity of flow- Bernoulli's theorem - Applications of Bernoulli's theorem.

Unit :IV Elasticity-Introduction– Load, Stress, strain – Hooke's law -Different types of Elasticity – Poisson's ratio-Relations connecting the elastic constants –Bending moment – Determination of Elastic constant (Searle's method).

Unit :V Sound -Simple harmonic motion – Linearity and superposition principle –Wave motion -Characteristics of wave motion-Transverse wave motion- Longitudinal wave motion-Definitions-Relation between frequency and wavelength-Properties of longitudinal progressive wave-Stationary waves-Properties of stationary longitudinal waves-Melde's experiment – Acoustics-Reverberation-Factors affecting the Acoustics of buildings-Requisite for Good Acoustics.

Text books :

1. Mathur.D.S, Revised by Hemne P.S - *Mechanics* , S. Chand & Co.,New Delhi, First Revised Edition, 2012 [UNITS I,II,III,IV]
2. Subramaniam. N, Brijlal, *A Text Book of Sound*, S. Chand & Co.,New Delhi,Second Revised Edition,1995 [UNIT V]

Unit: I Chapter 5.1-5.4,6.1,6.9,6.10,6.12

Unit: II Chapter 11.1-11.4,11.7,11.9

Unit: III Chapter 12.2,12.3,12.40,7.7.2,15.2,15.3,15.6,15.8,15.10

Unit: IV Chapter 13.1-13.3,13.7,13.11,13.12,14.5,14.13

Unit: V Chapter 1.3,1.10,4.1,4.3-4.8,6.1,6.2,7.5,10.14,10.15,10.20,10.22

Reference books:

1. Brijlal & Subramanyam.N, *Waves & Oscillations*, Vikas Publishing House Pvt. Ltd. Noida, Second Edition, 1994.
2. Gupta.A.B., *College physics*, *Volume I,* Books and Allied (P) Ltd., Kolkata, First Edition, 2011.
3. Murugesan.R, *Mechanics and Mathematical Methods,* S.Chand and Co., New Delhi, Third Edition, 2010.
4. Mathur.D.S, *Elements of properties of matter*, S.Chand and Co. New Delhi, First Edition, Reprint, 2012.
5. Paul.A.Tipler*, Physics, Volume I*, CBS Publishers and Distributors, New Delhi, First Edition 2003.

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CBCS

DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Skill based Elective-I

Title of the Paper : Basic Electronics
Semester : I **Contact Hours : 2**
Subject Code : 17SEP11 **Credits : 2**

Objectives :

To expose the students to

1. Various types of Passive components and their types
2. Transistor configurations and characteristics
3. Semiconductors and its types

Unit : I Resistors-Resistors – resistor type –wire wound resistors- carbon composition resistors – carbon film resistors – cermet film resistors – metal film resistors –power rating – value tolerance – variable resistors – potentiometers – rheostat – resistor colour code – resistance colour bands.

Unit : II Ind uctor-Inductor-Comparison of different cores – inductance of an inductor s – definition of inductance –mutual inductance – coefficient of coupling – variable inductors – Inductors in series or parallel without M – series combination with M.

Unit : III Capacitors-Capacitors – capacitor connected to a batter y – capacitance – factors controlling capacitance – types of capacitors – fixed capacitors – variable capacitors.

Unit :IV T ransistor-Bipolar Junction Transistor- Transistor Biasing–Important biasing Rule-Transistor Circuit Configuration-CB, CE, CC Configurations and Characteristics- Relation between Transistor Currents-Leakage Currents in a Transistor-Thermal Runway.

Unit : V Semiconductor and Type of Semiconductors -Semiconductor – bonds in semiconductor – crystals – commonly used in semiconductor – Energy band description of

semiconductors – effect of temperature of semiconductors -Intrinsic semiconductor – extrinsic semiconductor – N type – P type semiconductors.

Text Books :

1. Metha V.K. & Rohit Metha, *Principles of Electronics*, S.Chand and Company Limited, New Delhi, Third Revised Edition, 2010. [UNIT V]

2. Theraja B.L, *Basic electronics solid state* , S.Chand and Company Limited, New Delhi, Second Edition, 2012. [UNIT-I,II,III,IV]

Unit: I Chapter 5.1 – 5.15

Unit: II Chapter 5.19 - 5.27

Unit: III Chapter 5.35 – 5.41

Unit: IV Chapter 18.1-18.13

Unit: V Chapter 5.1 – 5.11

Reference Books:

1. Ghosh.B*, Fundamentals Principles of Electronics*, Books and Allied (P) Ltd., Kolkata, Second Edition, 2011.

2. Halkias.C.C, Millman.J, *Integrated Electronics*, Tata McGraw Hill Education Private Limited, New Delhi, 2012.

3. Robert L., Boylest & Louis Nashelsky, *Electronics Devices and Circuit Theory*, Prentice Hall of India Private Limited, New Delhi, Eighth Edtion, 2002.

4. Salivahanan & Suresh Kumar N*., Electronic Devices and Circuits*, Tata McGraw Hill Education Private Limited, New Delhi, Second Edition, 2012.

5. Sedha.R.S*, Applied Electronics*, S.Chand and Company LTD, New Delhi, Sixth Edition, 2006.

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DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Skill based Elective- II

Title of the Paper : Digital Electronics
Semester : I **Contact Hours : 2**
Subject Code : 17SEP12 **Credits : 2**

Objectives:

To introduce the fundamentals of

1. Binary number system
2. Demorgan's law and applications
3. Karnaugh map

Unit :I Binary number system-Number System – conversion of decimal number to binary number – binary to decimal conversion – binary addition – binary subtraction – 2's complement method – binary multiplication and division – hexadecimal numbers.

Unit :II Logic gates-Basic logic gates AND gate –OR gate –NOT gate– characteristics of logic gates –NOR gate- NAND gate –Exclusive OR gate- Logic gate families- TTL NAND gate- TTL NOR gate.

Unit :III Demorgan's laws and applications-Boolean equation of logic circuits – standard forms for expressing logic functions – Sum of products form-Products-of-sums form-Boolean algebra – Demorgan's laws The NAND gate and NOR gate as universal building block, different expressions for EX-OR gate.

Unit :IV Karnaugh Map-Two variable map-three variable map- four variable map- minterm-maxterm-truth table form karnaugh map-Don't care conditions product- of-sums simplifications.

Unit :V Binary adder-Half adder – full adder- half subtractor-full subtractor-multiplexer-demultiplexer-encoder –decimal to BCD encoder –decoders - BCD- to-decimal decoder-BCD to seven segment decoder.

Text Book:

*1.*Jose Robin.G, Ubald Raj.A, *Analog Electronics and Digital Electronics*, Indira Publications, Marthandam, First Edition, 2008.

Unit: I Chapter6

Unit: II Chapter 7a

Unit: III Chapter 7b

Unit: IV Chapter 7c

Unit:V Chapter 8

Reference Books:

1. Ghosh.B, *Fundamental Principles of Electronics,* Books and allied (P) Ltd., Kolkata, Second Edition, 2011.

2.Hohn.D.Ryder*, Electronic Fundamentals and Applications*, PHI Learning Private Limited, New Delhi, Fifth Edition, 2009.

3.Salivahanan.S & Arivazhagan.S, *Digital Circuits and Design*, Vikas Publishing House PVT. LTD, New Delhi, Third Edition, 2007.

4.Salivahanan.S & Suresh Kumar.N, *Electronic Devices and Circuits*, Tata McGraw Hill Education Private Limited, New Delhi ,Second Edition, 2011.

5.Raja.P, *Digital Electronics*, SCI Tech Publication (India) PVT. LTD, Chennai, Second Edition, 2011.

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DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Non Major Elective- I

Title of the Paper : Energy Physics
Semester : I **Contact Hours : 2**
Subject Code : 17NMP1 **Credits : 2**

Objectives:

To introduce

1. The Fundamentals of Energy sciences.
2. Types of Energy.
3. Applications of energy.

Unit :I Fundamentals of Energy Science-Introduction-Energy sectors- Classification of Energy Resources-Importance of Non–Conventional energy sources-Advantages and Disadvan tages of conventional energy sources-Environmental aspects of energy.

Unit :II Solar Energy-Introduction-solar collectors-solar water heater-solar industrial Heating System-Solar refrigeration and air conditioning system-Solar cookers-Solar Furnaces-Solar green house.

Unit :III Wind Energy-Introduction-Origin of winds-Nature of winds-Wind turbine sitting-Major application of wind power-Environmental aspects- Wind energy programme in India.

Unit :IV Biomass Energy-Introduction- Photosynthesis process-Bio fuels-Biomass Resources-Biomass conversion Technologies- Biogas production from waste biomass - Biomass energy programme in India.

Unit : V Ocean Energy- Introduction-Tidal Energy- Origin and Nature of Tidal – Limitations of Tidal energy-Wave Energy- Power in Waves- Ocean thermal Energy- Ocean thermal Energy Conversion Technology.

Text Book:

1. Khan B.H, *Non-conventional energy Resources*, Tata McGraw Hill Education Private Limited, New Delhi, 2012.

Unit : I Chapters 1.1,1.2,1.4,1.6,1.9,1.11

Unit : II Chapters 5.1,5.21,5.23,5.3,5.7,5.71,5.72,5.8,6.1,6.2,6.3,6.31,6.36,6.53

Unit : III Chapters 7.1-7.5, 7.12, 7.13

Unit : IV Chapters 8.1-8.5,8.9,8.10

Unit : V Chapters 10.1,10.2,,10.2.1,10.2.2,10.3,10.3.1,10.4,10.4.2

Reference Books:

1. Kothari D.P & Singal K.C., Rakeshranjan, *Renewable energy source and emerging technologies,* PHI Learning Private Limited, New Delhi, First Edition, 2011.

2.Rai G.D., *Solar energy utilization*, Khanna Publishers, New Delhi, Fourth Edition, 2008.

3. Solanki C.S., *Renewable energy technologies*, PHI Learning Private Limited, New Delhi, First Edition, 2009.

4.TiwariG.N, *Solar energy fundamentals, design modeling and applications*, Narosa Publishing House, New Delhi, First Edition Reprint, 2013.

5. Twidell J. & Weir T., *Renewable Energy Resources*, Taylor and Francis, Abbigndon,Oxon, Second Edition, 2013.

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DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Title of the Paper : Heat and Thermodynamics
Semester : II **Contact Hours : 4**
Subject Code :17P21 **Credits : 4**

Objectives:

To familiarize the students with

1. Transmission of heat.
2. Kinetic theory of gases.
3. Laws of Thermodynamics in understanding the thermal properties of matter.

Unit :I Calorimetry-Definitions – Newton's law of cooling-Specific heat of liquid-Callendar and Barne's Continuous flow method –Two Specific heats of gases – Specific heat of gas at constant volume by Joly's Differential Steam Calorimeter-Specific heat of a gas at constant pressure by Regnault's method- Dulong and Petit's law.

Unit :II Transmission of Heat-Introduction – Coefficient of thermal conductivity- Lee and Charlten's method for bad conductors-Spherical shell method (Radial flow of heat)-Cylindrical flow of heat – Thermal conductivity of Rubber - Thermal conductivity of Glass-Wiedmann and Franz law.

Unit :III Radiation-Properties of thermal Radiation – Applications of heat radiations - Thermos flask-Blackbody-Stefan's law-Mathematical derivation of Stefan's law-Experimental determination of Stefan's constant- Solar constant- temperature of sun-solar spectrum.

Unit :IV Kinetic Theory of Gas- Postulates of kinetic theory of gases-Degrees of freedom and Maxwell's law of equipartition of energy- Atomicity of gases - Maxwell's law of distribution of velocity(theory only)-Experimental verification- Mean free path-Transport phenomena-viscosity of gases- thermal conductivity of gases.

Unit :V Thermodynamics-First Law of Thermodynamics- Isothermal process- Adiabatic process- Gas equation during an adiabatic process-determination of γ by Clement and Desormes method-Second Law of thermodynamics- Carnot's reversible engine - Clapeyron Latent heat equation -Entropy-change in entropy in reversible and irreversible process- Maxwell's thermodynamical relations-.

Text Book:

1. Brijlal and Subramanyam.N, *Heat and Thermodynamics* ,S.Chand & Company Ltd,New Delhi, (Reprint 2002)

Unit: I Chapters 3.1,3.5,3.7,3.10-3.12,3.17

Unit: II Chapters 8.1,8.2,8.9,8.11,8.12,8.13,8.14,8.17

Unit: III Chapters 8.27-30,8.35,8.36,8.38,8.43,8.44,8.48

Unit: IV Chapters 5.13,5.21,5.22,5.23,5.24,5.25,5.26,5.27,5.28

Unit: V Chapters 6.8,6.11,6.12,6.15,6.20,6.25, 6.26,6.38 6.44,6.46,6.52

Reference Books:

1. Arora C. L. & Rajam J. B., *Heat and Thermodynamics for Degree Students*, S. Chand & Company Ltd., New Delhi, Eighth Edition, 1979.

2. Daniel V. Schroeder, *An Introduction to Thermal Physics*, Pearson Education, New Delhi, First Edition, Reprint, 2012.

3. Gupta A.B. & Roy A.B., *Thermal Physics*, Books & Allied(P) Ltd., Kolkata, First Edition, 2002.

4. Panat P.V., *Thermodynamics and Statistical Mechanics*, Narosa Publishing House, Kolkata, First Edition Reprint, 2011

5. Saxena A.K., *An Introduction to Thermodynamics and Statistical Mechanics,* Narosa Publishing House, Kolkata, First Edition, 2010.

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DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Title of the Paper : Major Physics Practicals-I
Semester : I-II **Contact Hours : 2**
Subject Code :17P2P **Credits : 3**

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1. Young's modulus-uniform bending using Pin & Microscope method.
2. Young's modulus-uniform bending using optic lever method
3. Young's modulus-non-uniform bending using Pin & Microscope method.
4. Young's modulus-non-uniform bending using optic lever method
5. Rigidity modulus by Torsion pendulum.
6. Compound pendulum-To find g and K
7. Spectrometer-Dispersive power of Prism.
8. Spectrometer-Grating minimum deviation
9. Potentiometer- low range-voltmeter calibration
10. Potentiometer-ammeter calibration
11. Sonometer- To determine the unknown frequency
12. Melde's string –To determine frequency of the vibrator

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DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Skill based Elective –III

Title of the Paper : Electronic Instrumentation
Semester : II **Contact Hours : 2**
Subject Code : 17SEP21 **Credits : 2**

Objectives:

To introduce the fundamentals of

1. Power supply and CRO
2. Various measuring instruments
3. Various electronic meters

Unit :I Power supplies- Introduction-Linear mode power supply-Requirements of linear mode power supply-rectifiers-half wave rectifier – full wave rectifier –bridge rectifier – Advantages of the bridge rectifier.

Unit :II Cathode ray oscilloscope-CRO - Vertical and horizontal voltage amplifiers-Power supply circuits– Cathode ray tube – Special Oscilloscopes- Applications of CRO.

Unit :III Ammeter, Voltmeter, Ohmmeter-Ammeter – DC voltmeter – Vacuum Tube Voltmeter –VTVM Using Vacuum Tube Diode –VTVM Using Triodes -Digital voltmeter-Series type ohmmeter – shunt type ohmmeter.

Unit : IV Multimeter-Digital multimeter – Measurement of resistance – measurement of inductance – measurement of capacitance – measurement of Q

Unit :V Measuring Instruments- Frequency meter –Time meter –Power meter –Watt meter – Electrodynamometer Watt meter.

Text Book:

1. Salivahanan, N.Sureshkumar, A.Vallavaraj, *Electronic devices &circuits*,Tata MC Graw Hill Publishing Company Limited, New Delhi, First Edition, 2003.

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Unit: I Chapters 15.1,15.2,15.2.1,15.2.2

Unit: II Chapters 19.1-19.2.5

Unit: III Chapters 19.3-19.6,19.7

Unit: IV Chapters 19.8-19.9.3

Unit: V Chapters 19.10 -19.14.1

Reference Books:

1. Albert D. Helfrick, William D.cooper, *Modern Electronics Instrumentation and Measurement techniques*, PHI Learning Private Limited, New Delhi, First Edition, 2011.

2. Basudev Ghosh, *Fundamental Principles of Electronics*, Books and Allied (p) Ltd, Kolkata, Second Edition,2011.

3. Jose Robin .G,Ubald Raj .A , *Basic Electronics and Applied Electronics*, Indira Publication, Marthandam, First Edition, 2004.

4. Kalsi .H.S, *Electronic Instrumentation*, Tata MC Graw Hill Publishing Company Limited, New Delhi, Third Edition, 2003.

5. RanganC.S, SarmaG.R,Mani .VSV, *Instrumentation Devices& systems* , Tata McGraw-Hill Education Private Limited, New Delhi, Second Edition, 2012.

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DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Skill based Elective –IV

Title of the Paper : Electricity
Semester : II **Contact Hours : 2**
Subject Code : 17SEP22 **Credits : 2**

Objectives:

To expose the students with

1. Static and current electricity.
2. Properties of dielectric materials and alternating currents.
3. Thermo electric effects useful in understanding the concepts of Electricity.

Unit :I Electrostatics-Electric field and flux – gauss law-Applications of gauss law-field due to a charged sphere –coloumb's theorem –mechanical force on the surface of a charged conductors –**Potential-**Electric potential –equipotential surface-relation between field and potential-electric potential energy.

Unit :II Current electricity -Current –current density- Expression for current density – Kirchhoff's law –Wheat stone's network –Carey foster's bridge –determination of resistivity and temperature coefficient of resistance - Potentiometer –principle calibration of ammeter, voltmeter .

Unit :III-Capacitors- Introduction –concept of capacitance –capacitance of an isolated spherical conductor –parallel plate capacitor with a dielectric- Dielectric strength– energy stored in capacitor .

Unit :IV Alternating currents -Introduction –Impedance ,Reactance and Admittance-Alternating voltage applied across a resistance –Alternating voltage applied across an inductance- Alternating voltage applied across a capacitance

Unit :V Thermo electricity-Introduction –Seebeck effect- variation of thermo - emf with temperature –Peltier effect –Explanation of Seebeck and Peltier effect-Peltier coefficient – Thomson effect and its prediction -EMF in a thermocouple

Text books:

1. Palaniappan.M*, Electricity and electromagnetism*, L.M.N Publication, Madurai, First Edition , 2002. (UNIT -I,II)

2. Satyaprakash, *Electricity and magnetism*, Pragati Prakashan, meetur, Twenty Sixth Edition 2011. (UNIT- III,IV,V)

Unit I : Chapters 1.1-1.8,2.1-2.8

Unit II : Chapter 4.1-4.11

Unit III : Chapter 7.1-7.4,7.6

Unit IV : Chapter 10.1,10.3,10.4-10.6

Unit V : Chapter 17.1-17.8

Reference books:

1. Basudev Ghosh, *Foundations of Electricity and Magnetism,* Books and Allied (p) Ltd, Kolkata, Third Edition, 2012.

2. Chattopadhay. D, Rakshit.P.C , *Electricity and Magnetism*, New Central Book Agency (P) Ltd, Kolkata, Fifth Edition, 2004.

3. Murugesan .R , *Electricity & Magnetism*, S. Chand & Company Ltd ,New Delhi, Sixth Edition, 2004.

4. Tayal.D. C., *Electricity and Magnetism*, Himalaya Publishing House, Mumbai, Second Edition, 1989.

5. Vasudeva.D.N.*, Fundamentals of Magnetism and Electricity* ,S. Chand & Company Ltd , New Delhi,Fifth Edition, 2011.

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CBCS

DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Non Major Elective –II

Title of the Paper : Astrophysics
Semester : II **Contact Hours : 2**
Subject Code :17NMP2 **Credits : 2**

Objectives :

To familiarize the students with

1. Our earth and moon
2. Solar system
3. Stars and Universe

Unit: I The earth-The zones of earth- shape of the earth- radius of the earth- rotation of earth-Foucault's pendulum experiment-gyroscope experiment

Unit: II The moon- Introduction- phases of moon- successive phases of moon- lunar librations- summer and winter full moons- path of the moon with respect to the sun- Surface structure of the moon- The tides.

Unit: III The solar system-Introduction- The sun- Mercury- Venus-Mars- Asteroids- Jupiter-Saturn- Uranus-Neptune.

Unit: IV The stellar universe-Introduction- Stellar motion- Solar motion- Constellation- The milky way-survey of constellations-winter constellations-spring constellations-summer constellations-autumn constellations

Unit: V Stars-Introduction- Distance of stars- Magnitude of stars- Absolute magnitudes- The colour and size of the stars- Star clusters.

Text Book:

1. Kumara velu. S, Susheela kumaravelu , *Astronomy* , Sivakasi Art printers,sivakasi, Second Revised Edition, 2007.

Unit : I Chapter:3 [87, 94,95,96102,104, 105]

Unit :II Chapter:12[229,239,240,243,244,245,252,255]

Unit :III Chapter:17[327-336]

Unit :IV Chapter:18[341-343,355,357,359]

Unit :V Chapter:18[344,345,347,349,353]

Reference books:

1. Abhyankar .K.D, *Astro Physics-Stars and Galaxies*, University Press (India) Ltd, Hyderabad,First edition, 2001.

2. BaidyanathBasu, Tanuka Chattopadhyay, Sudhindra Nath Biswas, *An Introduction to Astro Physics,* PHL Learning Private Ltd, New Delhi,Second Edition,2010.

3. Kumara velu. S, Susheela kumaravelu , *Space Research* , Sivakasi Art printers,sivakasi, First Edition, 2002.

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Useful websites:

1. http://www.astronomy.com
2. http://www.astronomy links .com.
3. http://p.webring:com/nub?ring=astroclub

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DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Title of the Paper	**: Mechanics , Properties of matter and Sound**		
Semester	**: I/III**	**Contact Hours**	**: 4**
Subject Code	**:17AP1**	**Credits**	**: 4**

Objectives :

To introduce the fundamentals of

1. Mechanics and Dynamics
2. Properties like Gravitation and Elasticity
3. Basic properties of sound

UNIT : I Force, Work, Power and Energy- The basic Forces in nature-Central forces – Conservative forces-Non conservative forces-Friction-Limiting friction, Co efficient of friction and Angle of friction-Laws of friction-Experiment to determine the coefficient of friction-Work –Work done by a varying force –Energy-Kinetic energy- Potential energy- power.

UNIT :II Rotational Motion- Angular velocity-Angular acceleration-normal acceleration - Centripetal forces – Centrifugal force- Torque –Angular momentum-Expression for torque in rotational motion-Expression for angular momentum of a rotating rigid body-Kinetic energy of rotation- Expression for work and power in rotational motion - Moment of inertia – Perpendicular axes theorem –Theorem of parallel axes-Moment of Inertia of Thin circular ring, circular disc, Solid cylinder, Solid sphere .

UNIT : III Gravitation-Kepler's law of planetary motion –Newton's law of gravitation-Mass and Density of the Earth-Determination of G-Boy's method – The compound pendulum-Determination of g with compound pendulum-Variation of g with latitude ,altitude and depth-artificial satellites.

UNIT : IV Elasticity-Different moduli of Elasticity-Poisson's ratio-Bending of beams – expressions for bending moment-determination of young's modulus by uniform and non

uniform bending – torsion of a cylinder-work done in twisting -Torsional oscillations of a body-Rigidity modulus by Torsion pendulum.

UNIT :V Sound-Simple harmonic Motion - composition of two S.H.M in a straight line-Beats progressive waves and their properties- -stationary waves and their properties- Melde's experiment -transverse and longitudinal modes-acoustics of buildings-ultrasonics, Production and applications.

Text Book :

1.Murugesan.R, *Mechanics,Properties of Matter and Sound ,* Vivekananda Press, Madurai, First edition, 2002.

Unit: I Chapter 1.1-1.14

Unit: II Chapter 2.1-2.18,2.21

Unit: III Chapter 3.1-3.9

Unit: IV Chapter 4.1-4.8,4.10-4.13

Unit: V Chapter 6.1-6.2,6.5-6.9,6.11-6.12

Reference Books :

1.Brijlal and Subramanyam.N, *Waves & Oscillations* , Vikas Publishing House Pvt. Ltd. Noida, Second Edition,1994.

2.Gupta.A.B.*College physics*, *Volume I* ,Books and Allied (P) Ltd, Kolkata, First edition, 2011.

3.Murugesan.R, *Mechanics and Mathematical Methods,* S.Chand and Co, New Delhi, Third edition, 2010

4.Mathur.D.S , *Elements of properties of matter*, S.Chand and Co New Delhi ,First Edition,Reprint,2012.

5.Paul.A.Tipler*, Physics, Volume I*, CBS Publishers and Distributors, New Delhi, First edition 2003.

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DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Title of the Paper : Thermal Physics
Semester : II/IV **Contact Hours : 4**
Subject Code :17AP2 **Credits : 4**

Objectives:

To expose the students with

1. Thermal properties.
2. Basic concepts in Thermodynamics
3. Role of Maxwell's Equations in Thermodynamics

UNIT: I Thermal expansion- Linear expansion of solids- Linear expansivity of crystals-Determination of α by air wedge method- Expansion of anisotropic solids- Solids of low expansivity and their uses-Anomalous expansion of water –Thermostat- Bimetallic thermostat -Isothermal change-Adiabatic change-Equation for the adiabatic change of a perfect gas-The two specific heat capacities of a gas-Difference between the two specific heat capacities– Joly's differential steam calorimeter for finding C_v-Regnault's method to find C_p.

UNIT :II Conduction –Introduction-Lee's disc method of determining the thermal conductivity of bad conductor-Analogy between heat flow and electric current-Wiedemann - Franz law-Thermal conductivity of air-Lee's disc method-Convection –Introduction - Convection in the atmosphere- Lapse rate-Stability of the atmosphere- Green house effect-Atmosphere pollution.

UNIT :III Radiation-Introduction-Stefan's law –Determination of Stefan's constant by filament heating method –Solar constant –Determination of solar constant by water flow pyrheliometer-Temperature of the sun - Temperature of the sun using Wein's Displacement law-Solar spectrum-Energy distribution in black body spectrum- Statement of planck's law of radiation-Wien's law -Rayleigh jean's law.

UNIT: IV Kinetic theory of gases-Postulates of the kinetic theory of gases- Expression for the pressure of a gas-Mean free path-Transport phenomena-Expression for the coefficient of Diffusion and viscosity-Maxwell's law of distribution of molecular speeds-Degrees of freedom-Boltzmann's law of equipartition of energy-Atomicity of gases.

UNIT: V Thermodynamics-Heat engine-Expression for the efficiency of a carnot's theorem-Carnot's theorem -Second law of thermodynamics-Entropy-Changes of entropy in carnot's cycle-Change of entropy in conversion of ice into steam. Low Temperature Physics-Joule Kelvin effect- Porous plug experiment –Theory of Porous plug experiment- Adiabatic demagnetisation-Superconductivity.

Text Book:

1.Murugesan.R, *Thermal Physics,* Vivekananda Press, Madurai, First edition, 2011.

Unit : I Chapter 1.1 -1.7, 2.1-2.7

Unit :II Chapter 3.1-3.5,4.1-4.6

Unit :III Chapter 5.1-5.12

Unit :IV Chapter 6.1-6.11

Unit :V Chapter 7.1-7.7,8.1-8.5

Reference Books:

1.Arora C. L. Rajam J. B, *Heat and Thermodynamics for Degree Students*, S. Chand & Company Ltd ,New Delhi, Eigth Edition, 1979.

2.Daniel V. Schroeder, *An Introduction to Thermal Physics*, Pearson Education, New Delhi, First Edition Reprint , 2012.

3. Gupta A.B, Roy A.B, *Thermal Physics* ,Books & Allied(P) Ltd, Kolkata, First Edition, 2002.

4.Panat.P.V, *Thermodynamics and Statistical Mechanics*, Narosa Publishing House, Kolkata, First Edition Reprint,2011

5.Saxena.A.K, *An Introduction to Thermodynamics and Statistical Mechanics,* Narosa Publishing House, Kolkata, First Edition, 2010.

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DEPARTMENT OF PHYSICS-UG

(w.e.f. 2017-2018 onwards)

Title of the Paper : Allied Physics practical-I
Semester : I-II/III-IV **Contact Hours : 2**
Subject Code : 17AP2P **Credits : 1**

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1. Young's modulus-uniform bending using Pin & Microscope method.
2. Young's modulus-uniform bending using optic lever method
3. Young's modulus-non-uniform bending using Pin & Microscope method.
4. Young's modulus-non-uniform bending using optic lever method
5. Rigidity modulus by Torsion pendulum.
6. Compound pendulum-To find g and K
7. Spectrometer-Refractive index of Prism.
8. Potentiometer- low range-voltmeter calibration
9. Potentiometer-ammeter calibration
10. Sonometer- To determine the unknown frequency
11. Sonometer- Verification of Laws
12. Melde's string –To determine frequency of the vibrator

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CBCS
DEPARTMENT OF PHYSICS
B.Sc. PHYSICS

(w.e.f. 2017-2018 Batch onwards)

Title of the Paper : Electromagnetism
Semester : III **Contact Hours : 4**
Subject Code :17P31 **Credits : 4**

Objectives:

This paper aims to impart comprehensive knowledge among students in

1. Electromagnetic interaction and electricity.
2. Static Electric and Magnetic Field.
3. Concept of Electromagnetic Induction.

Unit :I Static Electric Field

Maxwell's equation and their empirical basis-Introduction-Properties of charge-Conservation of charges- Quantisation of charge: Fundamental of charges-Coulomb's law –Definition of S.I unit of charge: coulomb-Comparison of electrical force with gravitational force-Principle of superposition-Electrostatic force due to a continuous distribution of charge-Electric field strength-Concept of electric field in terms of lines of force-Properties of electric lines of force.

Unit :II Static Magnetic Field

Introduction-Force on a moving charge in a uniform magnetic field- Lorentz force-Torque on a current loop-Moving coil ballistic galvanometer- Biot savart law-Relation between μ_o and ε_o-Magnetic field due to a current carrying straight wire- Force between current carrying parallel wires-Magnetic field induction on the axis of a current carrying circular loop.

Unit :III Magnetic Properties of Materials

Flux density in a magnetic material-Intensity of magnetization, Relative permeability and magnetic susceptibility-Diamagnetic, paramagnetic and ferromagnetic substance-Hysteresis and B-H curve(concept only)-Langevin's theory of diamagnetism-Langevin's theory of paramagnetism-Weiss' theory of ferromagnetism.

Unit :IV Electromagnetic Inductions

Faraday's law of electromagnetic induction-Faraday's laws in universal form-Self induction – Self inductance of a solenoid –Self inductance of a toroidal solenoid-Measurement of self inductance by Rayleigh's method-Mutual inductance-Reciprocity theorem of mutual inductances-Mutual inductance of solenoid coil system- Measurement of mutual inductance.

Unit :V Transient Currents

RC circuit-Measurement of high resistance by the method of leakage-Transients in series LCR circuit-Maxwell's bridge for self inductance-Anderson's bridge for self inductance-Owen's bridge for self inductance-De Sauty's bridge for capacitance-Wein's bridge for capacitance.

Text Book:

1.Satya Prakash, *Electricity and Magnetism* ,26th edition Pragati Prakashan, Meerut, 2011

Unit I: Chapter 14.5, 4.1-4.4, 4.6, 4.7, 4.9, 4.10-4.14

Unit II: Chapter 11.1 - 11.3, 11.9, 11.12-11.17

Unit III: Chapter 12.12-12.14 , 12.16-12.18

Unit IV: Chapter 13.1, 13.2, 13.7 - 13.15

Unit V: Chapter 9.1-9.3, 9.6, 16.2-16.6

Reference Books:

1. Duggal B.D, Chhabra C.L., *Fundamentals of Electricity and Magnetism* Built: Paperback & Hardbound 4th (Reprint), 2014

2. Murugesan.R, *Electricity&magnetism*, S.Chand&Coy, 6th edn New Delhi 2006.

3. Narayanamurthy.M , Nagarathnam.N, *Electricity and magnetism* 4th edn, National publishing co, Meerut

4. Tayal D. C, *Electricity and Magnetism*, Himalaya Publishing House,New Delhi, 2 edn, 1989

5. Vasudeva D.N, *Fundamentals of Magnetism and Electricity* ,S. Chand & Company Ltd, New Delhi, 5th Edn, 2011

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CBCS
DEPARTMENT OF PHYSICS
B.Sc. PHYSICS

(w.e.f. 2017-2018 Batch onwards)

Title of the Paper : Core-Optics
Semester : Four **Contact Hours: 4**
Subject Code :17P41 **Credits: 4**

Objectives:

This paper aims to impart comprehensive knowledge among students in

1. Various optical properties like Interference, Diffraction and Polarization.
2. Some Optical instruments and Phenomenon of Double refraction and Polarisation.

Unit: I Interference

Light waves-Superposition of waves-Interference-Theory of interference-Superposition of incoherent waves-Superposition of many coherent waves-Young's double slit experiment-Wavefront division-Coherence-Condition for interference-Fresnel Biprism(Experimental arrangement, Determination of wavelength of light)-Newton's rings-Condition for Bright and Dark rings-Michelson's interferometer(Construction and Working)

Unit: II Diffraction

Huygens-Fresnel theory-Fresnel's assumptions-Rectilinear propagation of light-Zone plate-Distinction between interference and diffraction-Fresnel and Fraunhoffer types of diffraction-Diffraction at a circular aperature.

Fraunhoffer Diffraction:

Fraunhoffer diffraction at a single slit(Theory only)-Fraunhoffer diffraction at a circular aperature.

Unit: III Polarization

Polarization-Unpolarized and polarized light-Natural light is unpolarized light-Types of polarization -Brewster's law-Polarizer and Analyser(only)-Malus's law, Huygen's explanation of Double refraction-Nicol prism-Effect of polarizer on light of different polarizations.

Unit: IV Lasers

Attenuation of light in an optical medium-Thermal equilibrium-Interaction of light with matter-Einstein coefficients and their relations-Light amplification-Meeting the three requirements-Components of laser-Lasing action-Types of lasers-Ruby laser-ND:YAG laser-Helium-Neon laser.

Unit: V Fibre optics

Optical fibre-Total internal reflection-Propagation of light through an optical fibre-Fractional refractive index change-Numerical aperature-Skip distance and Number of total internal reflection-Modes of propagation –The three types of fibres-Bandwidth-Characteristics of the fibres.

Text Books:

1. Subrahmanyam.N, Brijlal, Avadhanulu.M.N, *Optics*, S.Chand& company Ltd,New Delhi, Twenty Fifth Edition 2012

Unit:I Chapter 14.1-14.4(14.4.1-14.4.4), 14.5-14.7, 14.9, 14.9.1, 14.9.2, 15.6, 15.6.1, 15.7, 15.7.1-15.7.3

Unit :II Chapter 17.1-17.8, 18.1-18.3

Unit :III Chapter 20.1-20.5, 20.6.1.1, 20.8, 20.9, 20.11.1, 20.12, 20.13

Unit :IV Chapter 22.1-22.9, 22.14, 22.14.1- 22.14.3

Unit : V Chapter 24.1-24.8, 24.11, 24.17, 24.18

Reference Books

1.Anuradha De,*Optical fibre and Laser* ,New Age International (p) Lmt ,New Delhi, Second Edition 2009.

2. Ajoyghatak ,*Optics* , Tata McGraw Hill Education Pvt. Ltd., New Delhi, Fifth edition,2012

3.Chakrabarti P.K, *Geometrical and Physical Optics,* New Central Book Agency (P) Ltd. Kolkata, Second Edition, 2004.

4. Murugesan.R & Kiruthigasiva Prakash, *Optics And Spectroscopy* , S.Chand & Company Ltd., New Delhi, First Edition, 2013.

5.SathyaPrakash , *Optics* RatanPrakashanmandir, Agra, Twelfth Revised Edition, 2005.

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CBCS
DEPARTMENT OF PHYSICS
B.Sc. PHYSICS

(w.e.f. 2017-2018 Batch onwards)

Title of the Paper : Major Physics Practical-II
Semester : III-IV **Contact Hours: 2**
Subject Code : 17P4P **Credits : 3**

Any Twelve

1. AC frequency - Sonometer.
2. Copper Voltmeter – E.C.E of copper
3. Air wedge-determination of thickness of wire
4. Newton's rings –determination of radius of curvature.
5. Spectrometer –prism i-d curve to find refractive index.
6. Spectrometer –prism i-i' curve to find refractive index.
7. Spectrometer – Grating –resolving power & dispersive power
8. Carey foster bridge-determination of specific resistance
9. Charge sensitivity-galvanometer
10. Owen's bridge – determination of self inductance of the coil
11. Current & voltage sensitivity-spot galvanometer
12. Conversion of voltmeter using spot galvanometer
13. Comparison of emfs-spot galvanometer
14. Comparison of capacitances- using spot galvanometer
15. Maxwell's Bridge- self inductance of the coil.
16. Anderson's Bridge- self inductance of the coil.

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DEPARTMENT OF PHYSICS

B.Sc. PHYSICS

(w.e.f. 2017-2018 Batch onwards)

ANCILLARY PHYSICS (for B.Sc. Maths & Chemistry)

Title of the Paper : Electricity and Electronics
Semester : III/V **Contact Hours : 4**
Subject Code : 17AP3 **Credits : 4**

Objectives:

This paper aims to impart comprehensive knowledge among students in about

1. Electrostatics and Electricity
2. Some Fundamentals in Analog and Digital Electronics

Unit: I Current , Resistance and Electrical Measurements

Current and current density-Expression for current density-Equation of continuity-Ohm's law and electrical conductivity-Kirchhoff's laws-Carey foster bridge-Potentiometer

Unit: II Thermo-Electricity

Seebeck effect- Laws of thermo e.m.f- Measurement of thermo-EMF using potentiometer- Peltier effect- Thomson effect-Thermodynamics of Thermocouple-Thermo electric diagrams.

Unit : III Semiconductor Physics

Semiconductor-Intrinsic semiconductor-Extrinsic semiconductor-n type semiconductor-p type semiconductor-pn junction-properties of pn junction-Current flow in a forward biased pn junction-Volt ampere characteristics of pn junction.

Unit :IV Operational Amplifier

Operational amplifier- Schematic symbol of operational amplifier-output voltage from op-amp- Bandwidth of an op-amp- slew rate-Frequency response of an op-amp with negative feedback-Inverting Amplifier-Noninverting amplifier-voltage follower-Summing amplifier.

Unit : V Logic gates

Decimal to binary conversion-Binary to decimal conversion- OR gate-AND gate-NOT gate-Combination of basic logic gates- NAND Gate as a u niversal Gate- Boolean theorems-DeMorgans theorems

Text Books:

1. Murughesan .R, *Electricity and Magnetism*, Sixth Edition, S.Chand And Company Ltd, New Delhi, 2006 (UNIT-I,II).

2. Mehta V.K, Rohit Mehta Principles of electronics, Eleventh edition, S.Chand and Company Ltd, New Delhi, 2012 (UNIT-III,IV,V).

Unit I - Chapters 6.1-6.4,6.6,7.1,7.2

Unit II - Chapters 8.1-8.7

Unit III - Chapters 5.1,5.8-5.11,5.14,5.15,5.17,5.18

Unit IV - Chapters 25.15-25.17,25.19-25.24, 25.26,25.27,25.32

Unit V - Chapters 26.5,26.6,26.12-26.16,26.21,26.22

Reference books:

1. Duggal B.D. & Chabra C.L *Fundamentals of Electricity and Magnetism* Built: Paperback & Hardbound 4th (Reprint), 2014 Edition.

2. Jose Robin.G, Ubald Raj.A, *Analog electronics and Digital Electronics*, Indra Publications, Marthandam, 2008.

3. Theraja. B.L, *Basic Electronics Solid State*, Fifth Edition, S.Chand and Company Ltd, New Delhi, 2009.

4. Satya prakash, *Electricity and Magnetism,* 26th edition, Pragati Prakashan, Meetur, 2011.

5. Vasudeva D.N, *Fundamentals of Magnetism and Electricity* , Published by S. Chand & Company Ltd. Sultan Chand & Company, (2011).

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DEPARTMENT OF PHYSICS

B.Sc. PHYSICS

(w.e.f. 2017-2018 Batch onwards)

ANCILLARY PHYSICS (for B.Sc. Maths & Chemistry)

Title of the Paper : Optics
Semester : Fourth/sixth **Contact Hours : 4**
Subject Code :17AP4 **Credits : 4**

Objectives:

This paper aims to impart comprehensive knowledge among students in about

1. To get the basic idea about Geometrical optics and Dispersion.
2. To import the knowledge about the Interference and Diffraction.
3. To import the knowledge in Polarization.

Unit: I Geometrical optics

Convex lens –Principal Focus and Focal Planes-Refraction through a thin lens- Definition of Cardinal points and Respective Planes-Dispersion through a Prism-Cauchy's Formula-Achromatic in Prisms- Dispersion without Deviation-Direct vision Spectroscope.

Aberrations in Lenses: Spherical aberration in a lens-Chromatic aberration in a lens

Unit: II Interference

Introduction-Theory of interference fringes-Fresnel's Biprism-Displacement of fringes-Colours of thin films-Newton's rings-Determination of wavelength of sodium light by Newton's rings –Michelson's interferometer-Uses of Michelson's interferometer

Unit: III Diffraction

Introduction-Fresnel's explanation of rectilinear propagation of light-Zone plate-Diffraction at a circular aperture-Diffraction at a thin wire-Fraunhofer diffraction at a single slit-Fraunhofer diffraction at a double slit-Plane transmission diffraction grating- Resolving power of telescope-Resolving power of prism-Resolving power of a plane diffraction grating

Unit: IV Polarisation

Introduction-Polarisation by reflection-Pile of plates-Law of Malus-Double refraction-Huygen's theory of double refraction in uniaxial crystals-Huygen's construction for double refraction in uniaxial crystals-Quarter wave plate-Half wave plate-Laurent's half shade polarimeter

Unit: V Spectroscopy

Introduction-Infraredspectroscopy-Ultraviolet spectroscopy-Rayleigh's scattering-Raman effects-Experimental study of Raman effect-Quantum theory of raman effect-Application of raman effect-Nuclear magnetic resonance.

Text Books:

1. Murugesan.R & Kiruthigasiva Prakash, *Optics And Spectroscopy*, S.Chand & Company Ltd, New Delhi, First Edition, Reprint 2013.

UNIT I : Chapter 1.1-1.3, 1.5, 1.7-1.11, 1.16, 1.20

UNIT II : Chapter 2.1-2.5,2.8, 2.9, 2.11, 2.12

UNIT III : Chapter 3.1-3.3, 3.6, 3.9-3.12, 3.20,3.23,3.24

UNIT IV : Chapter 4.1-4.7, 4.12,4.13, 4.20

UNIT V : Chapter 5.1-5.9

Reference books:

1. Ajoy Ghatak, *Optics,* 5th Edition, Tata McGraw Hill Education Private Limited, New Delhi,2 012.

2. Feynman.R, Leighton.R.B & Sands.M, *The Feynman Lectures on Physics,* Vol II Pearson Education, 2013.

3. Halliday.D, Resnick .R and Krane-*Physics volume II*- Wiley India (p) Ltd., New Delhi, Fifth Edition.

4. Khanna Dr.H.R & Gulati.R,*Optics*, Chand & Co. New Delhi, 1979.

5. Subrahmanyam Brijlal.N, Avadhanulu.M.N, *Optics*, S.Chand& Company Ltd., New Delhi, Twenty Fifth Edition, 2012.

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DEPARTMENT OF PHYSICS

B.Sc. PHYSICS

(w.e.f. 2017-2018 Batch onwards)

ANCILLARY PHYSICS (for B.Sc.Maths&Chemistry)

Title of the Paper : Allied Physics practical-II
Semester : III-IV/V-VI **Contact Hours : 2**
Subject Code : 17AP4P **Credits : 1**

Any Twelve

1. Mirror galvanometer-voltage and current sensitiveness
2. Series resonance -LCR
3. Air wedge- thickness of wire
4. Dispersive power of a prism –spectrometer
5. Grating- normal incidence-spectrometer
6. Newton's rings determination of radius of curvature
7. Logic gates –AND,OR,NOT,-using discrete components
8. Logic gates-NAND,NOR-using discrete components
9. Verification of De Morgan's theorem using IC's
10. Diode characteristics
11. Zener diode characteristics
12. OP-amp as an adder
13. OP-amp as a subtractor
14. Parallel resonance – LCR

Annexure - 10

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DEPARTMENT OF PHYSICS
B.Sc. PHYSICS

(w.e.f. 2017-2018 Batch onwards)

Title of the Paper : Atomic and Nuclear Physics
Semester : V **Contact Hours : 4**
Subject Code : 17P51 **Credits : 4**

Objectives:

To familiarize the students with

1. The Atomic structure and various atom models
2. Elementary Particle Physics and nuclear models
3. Types of Particle accelerators and detectors

Unit: I Atomic Structure

Thomson Model of the Atom-Rutherford experiment- Scattering of α particles and Rutherford model of the atom-Rutherford scattering of α particles-Bohr model of the atom-Bohr's theory of the hydrogen spectrum-Spectral lines for hydrogen atom-Energy level of hydrogen atom - Resonance Excitation and Ionization potential.

Unit: II Vector Atom Model

Vector atom model- Spinning electron-Quantum numbers associated with the vector atom model- Coupling schemes- Applications of spatial quantization- Application of the vector model- Pauli's exclusion principle- Electronic structure in atom-Example of electronic configurations- Fine structure of spectral lines- optical spectra-Fine structure.

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Unit: III Nucleus & Nuclear Models

Introduction- Historical Developments- Constituents of the nucleus - Quantitative facts about nucleus- Binding energy- Nuclear angular momentum-Nuclear moments- wave mechanical properties-Yukawa theory of nuclear forces- Liquid drop model-Shell model- Fermi gas model- Collective model.

Unit: IV Particle Accelerators& Radiation Detectors

Introduction- Cockcroft and Walton Accelerator- Betatron- Synchrocyclotrons- Synchrotrons- Ionization Chamber- Scintillation Detectors- Cloud Chamber- Bubble Chamber – Spark Chamber.

Unit: V Particle physics

Introduction- Production of elementary particles- Types of interactions- Classification of elementary particles- Mass spectra and decays of elementary particles- Quantum Numbers- Conservation Laws.

Text Books:

1. Mittal V.K, Verma R.C, Gupta S.C , *Introduction to Nuclear and particle physics,* PHI Learning Private Ltd, New Delhi, Second Edition ,2011.(UNIT- III,IV,V)

2. Subrahmaniyam .N, Brijlal, *Atomic and Nuclear physics* S.Chand and company ltd, First Edition, New Delhi,1984.(UNIT- I,II)

Unit: I Chapter: 6.1-6.7A

Unit: II Chapter: 6.21-6.32

Unit: III Chapter: 1.1 -1.8, 1.10, 2.1-2.5

Unit: IV Chapter: 6.1, 6.2, 6.8, 6.9, 6.11, 7.3, 7.6, 7.8 -7.10

Unit: V Chapter 8.1-8.7

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Reference Books:

1. Basu C.R, *Atomic and nuclear physics*, New Central Book Agency (P) Ltd., Calcutta, First Edition, 2005.

2. Devanathan .V, *Nuclear Physics*, Narosa Publishing House Private Ltd, New Delhi, Second Edition, 2011.

3. Dayal D.C, *Nuclear physics*, Himalaya Publishing House, Mumbai, First Edition, 2012.

4. Gupta A.B, *Physics of the Atom*, Books And Allied Private Ltd, Kolkata, First Edition, 2012.

5. Rajam .J.B., *Atomic Physics*, S. Chand and Company Ltd, New Delhi, First Edition, 2002.

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Title of the Paper	**: Programming with C++**		
Semester	**: V**	**Contact Hours**	**: 4**
Subject Code	**: 17P52**	**Credits**	**: 4**

Objectives:

To expose the students to

1. Introduction to Object and Procedure oriented Programming.
2. Functions, Classes and Constructors in C++ and Concepts of inheritance.
3. File Input/ output operations.

Unit-I Principles of OOP and Beginning with C++

Basic concepts of OOP - Benefits of OOP - objects-objected oriented language - application of OOP - What is C++? - Application of C++ - A simple C++ program – More C++ statements - An example with class - Structure of C++ program.

Programs: Find the sum and Average of two numbers, Calculate the age using of Class.

Unit-II Tokens, Expressions and control structures:

Introduction – Token – Keywords – Identifier and constants – Basic data types – User Defined Data Types – Derived Data Types – Reference Variables – Scope Resolution Operator – Manipulators – Expressions and their Types – Control Structures.

Programs: find the inner block and outer block values Using Scope resolution operator, Using the manipulators illustrates the use of Endl and Setw.

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Unit-III Function in C++

Introduction – The Main Function - Function Prototyping – Call by Reference – Return by Reference – Inline Functions - Default Arguments – Constants Arguments – Function Overloading – Friend and Virtual Functions – Math Library Functions.

Programs: Find the multiplication and division of two numbers using Inline Functions, Find the volume of Cube, Cylinder and Rectangular box Using Function Overloading.

Unit-IV Classes and objects

Introduction – C Structures Revisited – Specifying a Class – Defining Member Functions – A C++ program with Class – Nesting of Member Functions - Arrays within a Class – Memory Allocated for Objects – Static Data Members – Static Member Functions – Arrays of Objects – Objects as Function Arguments – Friendly Functions.

Programs: Find the largest value of two numbers using Nesting of Member Functions, Calculate the mean value Illustrate the using Friend Function.

Unit-V Constructors and Destructors

Introduction – Constructors – parameterized Constructors – Multiple constructors in a class – constructors with default arguments – copy constructor – dynamic constructors – constructing Two-dimensional Arrays – const Objects – Destructors.

Programs: Illustrate the program using copy constructor, Illustrate the program using destructors.

Text Book:

1. Balagurusamy E., *Object Oriented Programming with C++*, Tata McGraw Hill Company Limited, New Delhi, Fourth Edition, 2011.

Chapters:

Unit: I	**Chapters 1, 2**	**1.5-1.8, 2.1-2.6**
Unit: II	**Chapter 3**	**3.1-3.7, 3.12, 3.14, 3.17, 3.19, 3 .24**
Unit: III	**Chapter 4**	**4.1-4.11**
Unit: IV	**Chapter 5**	**5.1-5.5, 5.7, 5.9-5.15**
Unit: V	**Chapter 6**	**6.1-6.5, 6.7-6.11**

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Reference books:

1. Herbert Schildt, *The Complete Reference C++,* Tata McGraw Hill Company, New Delhi, Third Edition, 1998.

2. Mike McGrath, *C++ Programming in easy steps*, Dreamtech Press, New Delhi, Third Edition, 2011.

3. Radha Ganesan .P, *Programming with C ++*, Scitech Publication (India) Pvt Limited, First Edition, 2002.

4. Ravichandran .D, *Programming with C++,* TMH Publication, New Delhi, Second Edition, 2002.

5. Robert Laffore, *Object oriented programming using C++,* Chennai, Sams publishing, Fourth Edition, 2002.

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ELECTIVE – I

Title of the Paper : Electronics
Semester : V **Contact Hours : 4**
Subject Code : 17PE5A **Credits : 4**

Objectives:

To introduce the fundamentals of

1. The various rectifiers and filters built of diodes and fundamentals of transistors
2. Operation of power Amps and Op Amps, Types of FETs and Oscillators
3. Sequential circuits their action and Converters

Unit: I Diode Circuits and Transistor fundamentals

The Half Wave Rectifier-The Transformer-The Full Wave Rectifier-The Bridge Rectifier-The Choke Input Filter-The Capacitor Input Filter-Clippers and Limiters-Clampers-The Zener Diode-The Loaded Zener Regulator-Variations in Current Gain-The Load Line-The Operating Point.

Unit: II Power Amplifiers and FETs

Darlington connections- Amplifier terms-Two load lines-Class A operation-Class B operation -FETs Basic ideas-Drain curves-The Transconductance curve-Biasing in the Ohmic region-Biasing in the active region- Transconductance-The Depletion mode MOSFET.

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Unit: III Operational Amplifiers and Oscillators

Introduction to Op Amps-The 741 Op Amp-The Inverting Amplifier-The Non Inverting Amplifiers-Theory of Sinusoidal Oscillation-The Wein's bridge Oscillator-The Colpitt's Oscillator-The 555 timer-Astable operation of the Timer.

Unit: IV Digital Sequential Circuits

Introduction-RS flip flops-Clocked RS flip flop -JK flip flop-JK master slave flip flop-D flip flop-Types of Shift registers-Serial in Serial out-Serial in Parallel out-Parallel in Serial out-Parallel in Parallel out.

Unit: V Counters and converters

Asynchronous counters- 3 Bit up and down counters-Synchronous counters-Decade counter-Variable resistor networks-Binary ladders-D/A converters-A/D converters.

Text Books:

1. Donald Mavino .A, Leach .P & Saha Gautam, *Digital Principles and applications*, Tata Mc Graw hill, New Delhi, Sixth Edition, 2002. [UNITS: IV, V]
2. Malvino.A.P, *Electronic Principles*, Tata Mc Graw Hill, New Delhi, Seventh Edition, 2002. [UNITS: I, II, III]

Unit: I	**Chapters**	**4.1-4.6, 4.10, 4.11, 5.1, 5.2, 7.1-7.3**
Unit: II	**Chapters**	**11.4,-12.1-12.4, 13.1-13.6, 14.1-14.3**
Unit: III	**Chapters**	**18.1-18.4, 23.1, 23.2, 23.4, 23.7, 23.8**
Unit: IV	**Chapters**	**8.1, 8.2, 8.4, 8.5, 8.8, 9.1-9.5**
Unit: V	**Chapters**	**10.1, 10.3, 10.5, 12.1-12.6**

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Reference books:

1. Chetan .D Pariksh, Christos Halkias, Jacob Millman, Millmans, *Integrated Electronics-Analog and digital Circuits an d Systems,* Tata Mc Graw hill, New Delhi, Second Edition, 2012.

2. Ghosh .B, *Fundamental Principles of Electronics*, Arunabha Sen Books and Allied (p) Ltd, Kolkata, Second Edition, 2011.

3. Jose Robin .G, Ubaldraj .A*, Analog electronics and Digital Electronics,* Indira Publications, Marthandam, First Edition, 2008.

4. Rohit Mehtha, V.K. Mehtha, *Principles of electronics*, S. Chand And company Ltd, New Delhi, Eleventh Edition,2012

5. Santhiram Kal, *Basic Electronics, Devices circuits and IT fundamentals*, PHI Learning Private Learning, New Delhi, First Edition, 2010.

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ELECTIVE -I (OPTIONAL)

Title of the Paper	**: Numerical Methods**		
Semester	**: V**	**Contact Hours**	**: 4**
Subject Code	**: 17PE5B**	**Credits**	**: 4**

Objectives:

To introduce the fundamentals of

1. Solving different kinds of problems occurs in computer applications
2. The students would be acquainted with the basic concepts in numerical methods.

Unit- I Algebraic and transcendental equations

Introduction – Errors in numerical computation method - Order of convergence - Iterative method -Successive approximation method - Bisection method – Method of false position.

Unit- II Simultaneous equations

Newton Raphson method - Gauss elimination method – Gauss Jordan method – Gauss Seidel Iteration method (problems only).

Unit- III Interpolation

Newton's interpolation formulae – Central difference interpolation formula (problems only) – Lagrange's interpolation.

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Unit- IV Numerical Differentiation and Integration:

Newton's forward and backward difference formulae – Numerical integration – Trapezoidal rule – Simpson's 1/3 rule (problems only).

Unit- V Differential equations

Numerical solution of ordinary differential equations – Taylor's series method- Euler's method – Runge kutta method (2^{nd} & 4^{th} order) (problems only).

Text Book:

1. Arumugam .S, Thangapandi Issaac .A, Somasundaram .A, *Numerical methods,* Scitech Publications (India) PVT Ltd, Chennai, 2002.

Unit: I	**Chapters**	**3.1, 3.2, 3.4**
Unit: II	**Chapters**	**4 .3, 4.4, 4.8**
Unit: III	**Chapters**	**7.1-7.3**
Unit: IV	**Chapters**	**8.1-8.2, 8.5**
Unit: V	**Chapters**	**10.1-10.4**

Reference Books:

1. Kandasamy P, Thilagavathy K Gunarathy K, *Numerical Methods*, S.Chand and Company Ltd, New Delhi, Third Edition. 2003.

2. Dr.Vedamurthy V.N, Dr.Iyengar.N.Ch.S.N , *Numerical Methods*, Vikas Publishing House PVT Ltd, Chennai 2008.

3. Rao V. Dukkipati, Numerical Methods, New Age International (p) Limited, Publishers, New Delhi, First Edition, 2010.

4. Sastry .S.S, *Introductory Methods of Numerical Analysis,* Prentice Hall Of India Private Ltd, New Delhi,2008.

5. Singaravelan, *Numerical Methods*, Meenakshi Agency, Channai, Sixth Edition, 2008.

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Skill Based Elective-V

Title of the Paper : Fibre Optic Communication
Semester : V **Contact Hours : 2**
Subject Code : 17SEP51 **Credits : 2**

Objectives:

To familiarize the students with

1. The Principles of Fibre Optic communication
2. Various systems and components
3. Some devices and applications in the Fibre optic communication.

Unit: I Principles of fibre optic communication:

Introduction and historical background – Advantages of optical fibre communication-Elementary fibre optic communication systems- Types of optical fibres- Numerical Aperture of optical f ibre- Fibre bundles and cables- Fibre strength- Fibre optical properties.

Unit: II Fibre optical source devices:

Types of optical sources- operation principle in LED and Laser- External Quantum Efficiency of LED- LED modulation Bandwidth- Coupling of LEDs with fibre – Edge Emitting LEDs.

Unit: III Fibre optical communication components:

Introduction- Coupling components for optical Fibres- Modulation methods and modulators- switchs- Transmitters- receivers- Optical amplifiers.

Unit: IV Fibre optical communication systems:

Wavelength division multiplexing- optical Time Division multiplexing- Data buses.

Unit : V Fibre optical networks:

Local Area network system- FDDI- SONET and SDH Networks- ISDN,BISDN and High speed Networks- Microwave technology Applications of Light wave systems.

Text Book:

1. D.C.Agarwal, *Fibre Optic Communication* , S.Chand & Company Pvt. Ltd , New Delhi, Fifth edition, 2002.

Unit: I Chapter 1-1.1to1.8

Unit: II Chapter 2- 2.1 to 2.6

Unit: III Chapter 5-5.1 to 5.6, 5.10

Unit: IV Chapter 6-6.6 to 6.8

Unit: V Chapter 6-6.9to6.12, 6.14

Reference Books:

1. Anuradha D , *Optical Fibre And Laser*, New Age International (p) Ltd, New Delhi, Second Edition, 2009.

2. Govind Agrawal .P, *Fibre Optic Communication Systems* ,Wiley India (p) Ltd ,New Delhi, Third Edition, 2007.

3. MukundaRao .M, *Optical communication*, Universities Press (India) Pvt Ltd, Hyderabad, First Edition, 2000.

4. Sarkar C.K, sarkar D.K , *Optoelectronics And Fibre Optics Communication*, New Age International (p) Ltd , New Delhi, First Edition 2001.

5. Subir Kumar Sarkar, *Optical Fibre and Fibre Optic Communication System,* S. Chand & Company Ltd , New Delhi, First Edition , 1997 .

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Title of the Paper	**: Solid State Physics**		
Semester	**: VI**	**Contact Hours**	**: 4**
Subject Code	**: 17P61**	**Credits**	**: 4**

Objectives:

To expose the students to

1. The bonding in solids.
2. Crystal Physics and part of X-rays in structure determination.
3. Magnetic materials and their properties.

UNIT-I Interatomic force &bonding in solids:

Interatomic force: Introduction – Force between atoms-Cohesion of Atoms and Cohesive energy – calculation of Cohesive energy.

Bonding in solids: Ionic Bonding –Bond energy of NaCl Molecule-Calculation of Lattice energy of Ionic crystal- The Born –Haber cycle –Properties of Ionic solids – Examples of Ionic solids –Covalent bond –Metallic bond –Hydrogen bond.

UNIT-II Crystal physics:

Introduction –Lattice points and space la ttice –Unit cells and Latt ice parmeters-Crystal systems-Metallic crystal structures for SC, BCC, & FCC structures - Other cubic crystal structure - Miller Indices & important features of Miller Indices.

X-ray diffraction &diffraction method: Bragg's law –Derivation of Bragg's equation.

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UNIT-III Magnetism in solids:

Magnetic Terminology –Types of Magnetism –Dia magnetism -(Langevin's classical theory)-Paramagnetism –(Langevin's classical theory)-Ferro magnetism-Weiss theory-concepts of Domains and Hysteresis- Anti Ferro magnetism-Ferri magnetism.

UNIT-IV Super conductivity:

Introduction –Electrical Resistivity –Perfect Diamagnetism or Meissner Effect – Super currents and Critical Temperature -Type-I –Type-II Superconductors.

UNIT-V Semi conductors:

Introduction –Pure or Intrinsic Semiconductors –Impurity or Extrinsic Semiconductor –Drift velocity, Mobility and conductivity of intrinsic semiconductors-Carrier concentration and Fermi level for intrinsic semiconductors.

Text books:

1. Pillai S.O, *Solid state physics*, New Age international (p) Limited, New Delhi, Sixth Edition, 2012. (UNITS-I, II)

2.Puri.R.K, Babbar V.K, *Solid state physics*, S. Chand publications, New Delhi, First Edition , 2010. (UNITS-III, IV, V)

UNIT I	**: Chapter**	**3.1-3.8, 3.11-3.14, 3.19, 3.24**
UNIT II	**: Chapter**	**4.1, 4.2, 4.4, 4.6, 4.15, 4.17-4.19, 5.7, 5.8, 5.12**
UNIT III	**: Chapter**	**8.1-8.3,8.3.1,8.4(8.4.1),8.5(8.5.1,8.5.3),8.6,8.7**
UNIT IV	**: Chapter**	**10.1-10.6,10.6.1,10.6.2,**
UNIT V	**: Chapter**	**7.1-7.5**

Reference Books:

1. Charles kittel, *Introduction to solid state physics*, Wiley Publication, Noida, Seventh Edition, 2011.

2. Ilogavan.K , *Solid state physics*, Publisher by S.Vishwanathan (printer and publisher), Chennai, First Edition, 2007.

3. Nandita Dasgupta and Amitava Dasgupta*, Semiconductor devices modeling and technology*, PHI Learning private limited, New Delhi, 2011.

4. Srivastava J.P*, Elements of solid state physics*, PHI Learning private limited, New delhi, Third Edition, 2011

5. Wahab M.A, *Solid state physics structure and properties of material*, Narosa publishing house, New Delhi, Second Edition, 2007.

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Title of the Paper	**: Spectroscopy**		
Semester	**: VI**	**Contact Hours**	**: 4**
Subject Code	**: 17P62**	**Credits**	**: 4**

Objectives:

To introduce the fundamentals of

1. Spectra of molecules.
2. IR and Raman spectroscopy.
3. Electronic spectra.

UNIT I Spectra of atoms

Angular Momentum of Many Electron Atoms -Normal Zeeman effect-Anomalous Zeeman Effect-Paschen-Bach Effect-Influence of Nuclear Spin-Hyperfine Structure-Stark Effect-Rydberg Atoms-Lamb Shift-Characteristic X-Ray Spectra-Moseley's Law.

UNIT II Rotation of molecules

Classification of molecules – Interaction of radiation wi th rotating molecule – Rotational spectra of rigid Diatomic molecule – Isotope effect in Rotational spectra – Intensity of Rotational lines – Non-rigid rotator – Vibrational excitation effect – Linear polyatomic molecules – Symmetric top molecules - Asymmetric top molecules.

UNIT III IR spectroscopy-diatomic molecule

Introduction-Vibrational Energy of a Diatomic Molecule -Infrared Selection rules-Vibrating Diatomic Molecule-Diatomic Vibrating Rotator-Asymmetry of Rotation-Vibration Band- rotation – Vibration spectra of polyatomic molecules.

UNIT IV Raman spectroscopy

Introduction- Theory of Raman Scattering-Rotational Raman Spectra- Vibrational Raman Spectra-Mutual Exclusion Principle -Industrial Applications-Raman Microscopy.

UNIT V Electronic spectra of Diatomic molecules

Introduction –Vibrational Coarse Structure- Franck-Condon Principle- Intensity of Vibrational Electronic Spectra- Rotational Fine Structure of Electronic- Vibration Spectra- Photoelectron Spectroscopy.

Text Book:

Aruldhas G., *Molecular Structure and Spectroscopy*, Prientice Hall India Learning Private Limited, New Delhi, Second Edition, 2011.

Unit I	**Chapter**	**3.9, 3.12-3.20**
Unit II	**Chapter**	**6.1-6.10**
Unit III	**Chapter**	**7.1, 7.3-7.6, 7.11**
Unit IV	**Chapter**	**8.1-8.5, 8.15, 8.17**
Unit V	**Chapter**	**9.1, 9.2, 9.6, 9.7, 9.12**

Reference Books:

1. Aravamudhan M. N, *An Introduction to Laser Theory and application*, S.Chand& Company, New Delhi, Second Edition, 2013 .

2. Ajoy Ghatak, Thiyagarajan. K, Optoelectronics, Cambridge University Press, India Pvt Ltd., New Delhi, First Edition, 2011.

3. Banwell, *Fundamentals of molecular Spectroscopy,* Tata Mcgraw Hill Ediucation, New Delhi, Fifth Edition, 2013.

4. Rajappan Nair. K. P, *Atomic Spectroscopy*, MJP Publishers, Chennai, First Edition, 2012.

5. Wilfred Sugumar .R, *Molecular and Atomic Spectroscopy*, MJP Publishers, Chennai, First Edition, 2008.

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Elective-I

Title of the Paper	**: Theoretical Physics**		
Semester	**: VI**	**Contact Hours**	**: 4**
Subject Code	**: 17PE6A**	**Credits**	**: 4**

Objectives:

To familiarize the students with

1. Basic concept of quantum idea.
2. Dual nature of microscopic particles.
3. Theory of relativity and its consequences.

Unit-I Classical Mechanics

Conservative Forces-Conservation theorem for energy of a particle-Mechanics of a system of particles-Degrees of Freedom – Constraints- Types of Constraints - Generalized co-ordinates- Transformation Equations - D'Alembert's Principles-Lagrangian Functions-Lagrange's Equation of Motion - Derivation of Lagrange's Equation of Motion -Application of Lagrange's Equation- Simple Pendulum –Compound Pendulum - The Atwood's Machine - The Hamiltonian Function H -Hamiltonian equation with derivation.

Unit-II Statistical Mechanics

Microscopic and Macroscopic descriptions-Ensembles-Degenerate and Non degenerate Ensembles-Phase space-Micro and Macro states- Thermodynamic probability- Boltzmann's theorem on entropy and probability –Derive the Boltzmann relation connecting entropy and Probability-Fundamental postulates of statistical mechanics- Statistical equilibrium.

Maxwell-Boltzmann distribution law-Application of Maxwell-Boltzmann distribution law to an ideal gas-Maxwell-Boltzmann velocity distribution law.

Unit-III Quantum Statistics

Introduction-Quantum statistics of identical particles - Bose-Einstein distribution law-Application of B.E Statistics- Planck's law of radiation-deduction-Wien's and Rayleigh-Jean's law-Fermi Dirac Distribution Law – Application of Fermi Driac Statistics-Comparision of three statists.

Unit-IV Wave Mechanics

Introduction- The De-Broglie wavelength- Davisson and Germer's Experiment-G.P.Thomson's experiment- Wave velocity of De-Broglie waves- Group velocity of De- Broglie waves- Expression for Group velocity- Relation between group velocity and wave velocity-Heisenberg's Uncertainty principle.

Unit-V Relativity

Frames of reference-Galilean transformation equation-Michelson Morley experiment-Postulates of Special theory of Relativity-Lorentz transformation equations-Derivation of the Lorentz transformation equations - Einstein's Mass- Energy Relation-Relation between the total energy, rest energy and the Momentum**.**

Text book:

1. R. Murugesan, *Theoretical physics*, First Edition, S.Chand & Company, New Delhi, 2004.

Unit: I	**Chapters**	**1.1-1.8, 1.14-1.20, 1.24-1.26**
Unit: II	**Chapters**	**2.1-2.12**
Unit: III	**Chapters**	**2.13-2.24**
Unit: IV	**Chapters**	**3.9, 3.10, 3.12-3.18**
Unit: V	**Chapters**	**4.1-4.6, 4.11, 4.12**

Reference Books:

1. Beiser, Shobhit Mahajan, S.Rai Choudhury,*Concepts of Modern Physics*, Tata MC Graw Hill Education Private Limited, New Delhi, Sixth Edition, 2012.

2. Herbert Goldstein, *Classical Mechanics*, Narosa Publishing house Pvt Ltd, New Delhi, Second Edition, 2001.

3. Murray R.Spiegel, *Theory and Problems of Theoretical Mechanics*, Tata MC Graw Hill Education Private Limited, Sixth Edition, New Delhi, 2012.

4. Panat .P.V, *Thermodynamics and Statistical Mechanics*, Narosa Publishing house Pvt Ltd, New Delhi, Second Edition, 2011.

5. Thankappan .V.K, *Quantum Mechanics*, New Age International (P) Ltd, New Delhi, Second Edition, 2012.

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Elective- II

Title of the Paper: Applications of Electronic Devices and Instrumentation

Semester	**: VI**	**Contact Hours**	**: 4**
Subject Code	**: 17PE6B**	**Credits**	**: 4**

Objectives:

To expose the student to

1. Electronic Instrumentation of Various measuring instruments.
2. Working and types of various electronic meters.

Unit-I Electronic Instruments

Electronic instruments- Multimeter- Applications of Multimeter- Sensitivity of multimeter- Merits and Demerits of multimeter- Meter protection- Vacuum tube voltmeter- Applications of VTVM- Merits and Demerits of VTVM- Cathode Ray Oscilloscope- Deflection sensitivity of CRT- Display of signal wave f orm on CRO - Signal pattern on screen- Various control of CRO- Applications of CRO.

Unit- II Recorders

Introduction- Strip Chart Recorder- Galvanometer Type Recorder-Null Type Recorder (Potentiometric Recorders- X-Y Recorder- Magnetic Recorders- Frequency Modulation (FM)- Recording- Applications of a Strip Chart Recorder- Multiple Recorder.

Unit -III Silicon Controlled Rectifier

Introduction -Silicon Controlled Rectifier (SCR)- Working of SCR- Equivalent circuit of SCR- Important terms- V-I characteristics of SCR- Applications of SCR- Light activated SCR.

Unit –IV Power electronics

Introduction -Power electronics- The Triac- Triac Construction- Triac Operation- Triac Characteristics-Applications of Triac- The Diac-Application of diac-Uni-junction Transistor(UJT)- Equivalent circuit of a UJT-Characteristics of UJT- Advantages of UJT-Applications of UJT as an oscillator.

Unit- V Integrated circuits

Introduction-Integrated circuit- advantages and disadvantages of integrated circuits- IC classifications- Fabrication of components on monolithic IC- Simple monolithic ICs- IC packings-IC symbols- Scale of integration- Some circuits using I Cs- OP Amp: Inverting and Non- inverting – Adder and Subrator- Differentiator and Integrator.

Text Books:

1. Mehta, Rohit Mehta V.K., *Principles of electronics,* 2013, S. Chand & co Limited, Ram Nagar, New Delhi, Eleventh Edition, 2008 **[**UNIT -I,III,IV,V]

2. Kalsi .H.S, *Electronic Instrumentation*, Tata Mc Graw-Hill Publishing Company Limited, New Delhi, Third Edition, 2003. **[**UNIT -II]

Unit: I	**Chapter**	**22.1 – 22.10,22.14, 22.15, 22.17-22.20**
Unit: II	**Chapter**	**12.1 – 12.4, 12.6 – 12.8, 12.15**
Unit: III	**Chapter**	**20.1 – 20.5, 20.12, 20.13**
Unit: IV	**Chapter**	**20.1-21.3, 21.5, 21.6, 21.8-21.15**
Unit: V	**Chapter**	**23.1, 23.2, 23.4, 23.6-23.11, 25.15, 25.24-25.26,25.32,25.34**

Reference Books:

1. Albert D. Helfrick, William D.cooper, *Modern Electronic Instrumentation and Measurement techniques*, PHI Learning Private Limited, New Delhi, Third Edition, 2011.

2. Basudev Ghosh, *Fundamental Principles of Electronics,* Books and Allied (p) Ltd, Kolkata, Second Edition, 2011.

3. Jose Robin .G, Ubald Raj .A, *Basic Electronics and Applied Electronics*, Indira Publication, Martha dam, Sixth Edition, 2004.

4. Prithwiraj Purkait, Budhaditya Biswas, Santanu Das, Chiranj ib Koley, Electrical and Electronics Measurements and Instrumentation, PHI Learning Private Limited, New Delhi, Third Edition, 2013.

5. Rangan C.S, Sarma G.R, Mani .VSV, *Instrumentation Devices& systems*, Tata McGraw-Hill Education, Private Limited, New Delhi, Second Edition, 2012.

Annexure - 10

E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI -14.

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CBCS
DEPARTMENT OF PHYSICS
B.Sc. PHYSICS

(w.e.f. 2017-2018 Batch onwards)

Title of the Paper : Major Physics Practical-III
Semester : V-VI **Contact Hours : 3**
Subject Code : 17P61P **Credits : 5**

Any Twelve:

1. LCR – Series resonance circuit.
2. LCR – Parallel resonance circuit.
3. Mutual inductance of the coil – B.G.
4. L –Rayleigh's bridge.
5. Spectrometer – Cauchy's constant.
6. Spectrometer – Hartmann's formula.
7. Spectrometer – Resolving power of a prism.
8. B.G – absolute capacity of condenser.
9. C_1/C_2 – De sauty's bridge.
10. Impedence & power factor – LR circuit. Field along the axis of a solenoid – determination of B & M.
11. Comparison of mutual inductance of the coil- spot galvanometer.
12. Program to perform Fibonacci series using c++ language.
13. Program to perform two dimensional sorting using c++ language.
14. Check odd or even number using inline function using c++ language.
15. Finding area of shapes using virtual function using c++ language.

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CBCS
DEPARTMENT OF PHYSICS
B.Sc. PHYSICS

(w.e.f. 2017-2018 Batch onwards)

Title of the Paper : Major Electronics Practical-IV
Semester : V-VI **Contact Hours : 3**
Subject Code : 17P62P **Credits : 5**

Any Twelve:

1. Zener diode – Voltage regulation.
2. Hartley's Oscillator – L determination.
3. UJT- Relaxation Oscillator.
4. Voltage doubler.
5. Dual Power supply – IC 78 and IC 79 series.
6. Astable multivibrator – transistor / IC 555.
7. Op-amp-IC741 – Differentiator and integrator.
8. Op-amp-IC 741-adder and subtractor.
9. IC-Logic gates-Truth table of all fundamental gates Verification (AND, OR, NOT, NAND, NOR).
10. Three Bit D/A converter.
11. IC-Logic gates- De Morgan's Theorems.
12. AND, OR , NOT-Using discrete components.
13. BCD to seven segment display.
14. Optoelectronic device-LED and seven segment display.
15. Binary addition- Half adder and Full adder.

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(w.e.f. 2017-2018 Batch onwards)

Skill based Elective-VI

Title of the Paper : Introduction to Microcontrollers 8051
Semester : VI **Contact Hours: 2**
Subject Code : 17SEP61 **Credits: 2**

Objectives :

This Paper aims to impart comprehensive knowledge among students is

1. Microprocessors
2. 8051Microcontrollers
3. 8051 Assembly Language Program

Unit: I Introduction to Microcontrollers

Introduction – Microcontrollers and Microprocessors– History of Microcontrollers and Microprocessors – Embedded Versus External Memory Devices- 8-bit and 16-bit Microcontrollers-CISC and RISC and Processors- Harvard and Von Neumann Architectures-Commercial Microcontroller Devices .

Unit: II 8051 Microcontrollers

Introduction- MCS -51 Architecture -Registers in MCS -51- General-purpose or working Registers – Stack pointer and prog ram counter – Special Function Registers (SFR).

Unit:III 8051 Pin Description, Connections, I/O Ports and Memory Organization

8051 Pin Description-8051 Connections -8051 Parallel I/O Ports-Memory Organization.

Unit:IV MCS-51 Addressing Modes and Instructions

8051 Addressing Modes- MCS-51 Instruction Set-8051 Instructions and Simple Programs- Using Stack Pointer.

Unit:V 8051 Assembly Language Programming Tools

8051 Assembly Language Programming – 8051 assembler – 8051 programming Template - Development Systems and Tools – Software Simulators of 8051.

Text Book:

1. Ajay V Deshmukh, *Microcontrollers [Theory and Applications*],Tata McGraw Hill Education Private Limited, New Delhi, Fifth Edition, 2010.

Unit:I Chapters 1.1-1.8

Unit: II Chapters 2.1-2.3

Unit: III Chapters 3.1-3.4

Unit: IV Chapters 4.1-4.4

Unit : V Chapters 5.1-5.3

Annexure - 10

Reference books :

1. Ramesh Gaonkar , *Microprocessor Architecture, Programming and Applications with the 8085*, PRI Penram International Publishing (India) Private limited, Mumbai, Fifth Edition,1999.

2. Walter A. Triebel, Avtar Singh, the 8085 and 8086 microprocessors, Dorling Kindersley (India) private limited New Delhi, Fourth Edition, 2007

3. Ram B, *Fundamentals of microprocessors & microcontrollers,* Dhanapat Rai publications, New Delhi, Seventh Edition, 2011.

4. Nagoorkani A,*Microprocessors & microcontrollers,* Tata Mcgraw Hill,New Delhi, Second Edition.2012.

5.Raphae Chung-weiphan,Scott Mackenzie,*The 8051 Micro controller*, Fourth Edition,Pearson education, New Delhi, 2008.

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DEPARTMENT OF PHYSICS

B.Sc. PHYSICS

(w.e.f. 2017-2018 Batch onwards)

Elective –III Project

Title of the Paper : Project
Semester : VI **Contact Hours : 2**
Subject Code : 17PPR6 **Credits : 3**

Students have to carry out Project Works under the guidance of the members of the Physics Department during V and VI semester 2 hours per week. PROJECT Work may be chosen in any field in Physics. Each batch will complete the project work in the month of February and submit their report in March. It will be duly signed by the project guide and the HOD of Physics. It will be evaluated 80 marks for external examiner and 20 marks for internal examiner. The viva on project work will be conducted during the Practical Examination at the end of VI semester. The viva on project will be conducted jointly by Guide, External Examiner HOD and the members of staff.