CHOICE BASED CREDIT SYSTEM – STRUCTURE

FOR THOSE WHO HAVE JOINED FROM THE ACADEMIC YEAR 2017–18 ONWARDS

B.Sc PHYSICS

Part	Course	Subject	Code	Hrs.	6th Hr.	Cr.	Adl. Cr.	Exam (Hrs)	Marks	
									Int.	Ext.
SEMESTER - I										
I	Lang. – I	Tamil – I	170103101	6		3		3	25	75
II	Lang. – II	English – I	171003101	6		3		3	25	75
III	Core	Properties of matter and Thermal Physics	172103101	4		4		3	25	75
	Core	Electricity	172103102	4		4		3	25	75
	Core Lab	Practical –I	-	2				–	–	–
	Al. Maths	Allied Mathematics Paper–I	172003121	6		5		3	25	75
IV	SBE - I	Material science	174403121	2		2		2	25	75
V	Extension activities	NSS / NCC / PED	–		3			–	–	–
	Additional Courses	Communicative English–I	–		2			–	–	–
		Computer Literacy	–		1			–	–	–
SEMESTER - II										
I	Lang. – I	Tamil – II	170103201	6		3		3	25	75
II	Lang. – II	English – II	171003201	6		3		3	25	75
III	Core	Optics and Spectroscopy	172103201	4		4		3	25	75
	Core	Electromagnetism	172103202	3		3		3	25	75
	Core Lab	Practical– I	172103203	2		2		3	40	60
	Al. Maths	Allied Mathematics Paper–II	172003221	6		5		3	25	75
IV	SBE - II	Renewable Energy sources	174403221	2		2		2	25	75
	EVS	Environmental Studies	174103201	1		1		2	–	100
V	Extension activities	NSS / NCC / PED	–		3			–	–	–
	Additional Courses	Communicative English–I	178003201		2		1	3	25	75
		Computer Literacy	–		1			–	–	–
	SLC	Law and Society	178003202				3	3	–	100
SEMESTER - III										
I	Lang. – I	Tamil – III	170103301	6		3		3	25	75
II	Lang. – II	English – III	171003301	6		3		3	25	75
III	Core	Classical Mechanics	172103301	2		2		3	25	75
	Core Lab	Practical– II	-	2		–		–	–	–
	Al. Maths	Allied Mathematics Paper– III	172003321	6		5		3	25	75
	Al. Che	Inorganic, Organic and Physical Chemistry – I	172203321	4		4		3	25	75
	Al. Che	Volumetric Analysis Lab	-	2		–		–	–	–
IV	NME - I	Basic Physics – I	174603321	2		2		2	25	75
V	Extension activities	NSS / NCC / PED	–		3			–	–	–
	Additional Courses	Communicative English–II	–		2			–	–	–
		Computer Literacy	–		1			–	–	–
	SLC	Human Rights	178003301				3	3	–	100

Part	Course	Subject	Code	Hrs.	6th Hr.	Cr.	Adl. Cr.	Exam (Hrs)	Marks	
									Int.	Ext.
SEMESTER - IV										
I	Lang. – I	Tamil – IV	170103401	6		3		3	25	75
II	Lang. – II	English – IV	171003401	6		3		3	25	75
III	Core	Statistical Physics	172103401	2		2		3	25	75
	Core Lab	Practical–II	172103402	2		2		3	40	60
	Al.Maths	Allied Mathematics Paper – IV	172003421	6		5		3	25	75
	Al.Che	Inorganic, Organic and Physical Chemistry – II	172203421	4		4		3	25	75
	Al.Che	Volumetric Analysis Lab	172203423	2		3		3	40	60
IV	NME - II	Basics of Photography	174603421	2		2		2	25	75
V	Extension activities	NSS / NCC* / PED*	-		3	1		3	25 *40	75 *60
	Additional Courses	Communicative English–II	178003401		2		1	3	25	75
		Computer Literacy	-		1			–	–	–
	SLC	C Programming	178003421				4	3	–	100
SEMESTER - V										
III	Core	Basic Electronics	172103501	5		5		3	25	75
	Core	Atomic Physics	172103502	5		5		3	25	75
	Core	Solid state Physics	172103503	5		5		3	25	75
	Core Lab	Physics Lab – III	–	3				–	–	–
	Core Lab	Physics Lab – IV	–	3				–	–	–
	Al.Che.	Inorganic and Physical Chemistry	172203521	4		4		3	25	75
	Al.Che.Lab	Organic Analysis Lab	-	2				–	–	–
IV	SBE – III	Medical Physics	174403521	2		2		2	25	75
	WS	Women Studies	174503501	1		1		2	–	100
	Additional Courses	Communicative English –III	–		2			–	–	–
		Computer Literacy	–		1			–	–	–
		Skill Development – Career Guidance	–		3			–	–	–
	SLC	Communication Systems	178003521				4	3	–	100
SEMESTER - VI										
III	Core	Digital Electronics	172103601	5		5		3	25	75
	Core	Nuclear Physics and Quantum mechanics	172103602	5		5		3	25	75
	Core	Project *Report;@Viva	172103603	6		5		–	40 [24:16]	60 [36:24]
	Core Lab	Physics Lab – III	172103604	3		3		3	40	60
	Core Lab	Physics Lab – IV	172103605	3		3		3	40	60
	Al. Che.	Organic and Physical Chemistry	172203621	4		4		3	25	75
	Al.Che.Lab	Organic Analysis Lab	172203622	2		3		3	40	60
IV	VBE	Value Based Education	174303601	2		2		2	–	100
	Additional Courses	Communicative English–III	178003601		2		1	3	25	75
		Computer Literacy	178003602		1		1	3	–	100
		Skill Development – Career Guidance	178003603		3		2	3	–	100
		TOTAL		**180**	**36**	**140**	**20**			

	ALLIED – PHYSICS FOR MATHEMATICS						
Sem	**Title of the Paper**	**SUB CODE**	**Hrs.**	**Cr.**	**Exam (Hrs)**	**Marks**	
						Int.	**Ext.**
I	Mechanics, Properties of Matter and Sound	172103121	4	4	3	25	75
II	Thermal Physics	172103221	4	4	3	25	75
II	Allied Physics Practical – I	172103222	2	2	3	40	60
III	Electricity and Electronics	172103321	4	4	3	25	75
IV	Optics and Modern Physics	172103421	4	4	3	25	75
IV	Allied Physics Practical – II	172103423	2	2	3	40	60
	ALLIED – PHYSICS FOR CHEMISTRY						
Sem	**Title of the Paper**	**SUB CODE**	**Hrs.**	**Cr.**	**Exam (Hrs)**	**Marks**	
						Int.	**Ext.**
III	Mechanics, Properties of Matter and Sound	172103322	4	4	3	25	75
IV	Thermal Physics	172103422	4	4	3	25	75
IV	Allied Physics Practical – I	172103426	2	2	3	40	60
V	Electricity and Electronics	172103521	4	4	3	25	75
VI	Optics and Modern Physics	172103621	4	4	3	25	75
VI	Allied Physics Practical – II	172103622	2	2	3	40	60
	ALLIED – PHYSICS FOR COMPUTER SCIENCE						
Sem	**Title of the Paper**	**SUB CODE**	**Hrs.**	**Cr.**	**Exam (Hrs)**	**Marks**	
						Int.	**Ext.**
I	Digital Principles and Applications	172103122	4	3	3	25	75
II	Digital Electronics Practicals	172103223	3	2	3	40	60
	ALLIED – PHYSICS FOR INFORMATION TECHNOLOGY						
Sem	**Title of the Paper**	**SUB CODE**	**Hrs.**	**Cr.**	**Exam (Hrs)**	**Marks Allotted**	
						Int.	**Ext.**
II	Digital Principles and Applications	172103224	4	4	3	25	75
II	Digital Electronics	172103225	2	2	3	40	60

Core Subject **BASIC ELECTRONICS** **Code: 172103501**

SEMESTER V **5 Hrs/Week**

Credits 5

Objectives:-

- ***To understand the basic principles of Electronics and Communication Systems.***
- ***To acquire knowledge about electronic components like transistor and OPAM***

UNIT – I: **[12 Hrs]**

Filters and Hybrid Parameters: Thevenin's theorem (statement and explanation only) –Procedure for finding Thevenin's equivalent circuit- Norton's theorem (statement and explanation only) - Procedure for finding Norton's equivalent circuit- Filter circuits – Types of filter circuits – Hybrid Parameters – Determination of h parameters – h parameter equivalent circuit – Performance of a linear circuit in h parameters – The h parameters of a transistor - Transistor circuit performance in h parameters – Approximate hybrid formulae for transistor amplifier - Experimental determination of transistor h parameters – Limitations of h parameters

UNIT – II: **[12 Hrs]**

Transistors and Biasing: Common base connection – Characteristics of common base connection - Common emitter connection – Characteristics of common emitter configuration – Common collector configuration – Comparisons of Commonly used transistor connections - Transistor as an Amplifier in CE arrangement – Transistor load line analysis – Operating point – Performance of transistor amplifier – Cut off and saturation points – Methods of transistor biasing - Base resistor method – Emitter bias circuit – Circuit analysis of emitter bias - Biasing with collector feedback resistor – Voltage divider bias method

UNIT – III: **[12 Hrs]**

Feed back amplifiers and power amplifiers: Feedback – Principles of negative voltage feedback in amplifiers – Gain of negative voltage feedback amplifier - Advantages of negative voltage feedback – Principles of negative current feedback – Current gain with negative feedback – Effect of negative current feedback – Emitter follower – DC analysis of emitter follower – Voltage gain of the emitter follower – Input and Output impedance of emitter follower– Applications of emitter follower

UNIT – IV: **[12 Hrs]**

Sinusoidal Oscillators, Regulated DC Power Supply and OP-AMPS: Sinusoidal oscillator - Types of sinusoidal oscillations –

Undamped oscillations from tank circuit – Essentials of transistor oscillator – Explanation of Barkhausen criterion – Different types of transistor oscillators - Colpitt's oscillator - Hartley oscillator- Principle of Phase shift oscillators - Phase shift oscillator - Wien bridge oscillator - Transistor crystal oscillator – Regulated DC Power Supply: Ordinary DC power supply – Regulated power supply – Types of voltage regulators – Zener diode voltage regulator – Conditions for proper operation of Zener regulator - Transistor series voltage regulator – OP–AMPS: Ideal OP–AMP – Virtual ground – OP–AMP Applications: linear amplifier – unity follower, adder, subtractor, integrator, differentiator and comparator.

UNIT – V: **[12 Hrs]**

Modulation and Demodulation: Modulation – Types of modulation – Amplitude modulation – Modulation factor – Analysis of A.M. Wave – Sideband frequencies in A.M. Wave – Transistor A.M. modulator – Power in A.M. Wave – Limitations of Amplitude modulation - Frequency modulation – Frequency deviation and carrier swing – Modulation index – Deviation ratio – Percent of modulation – F.M. Sidebands – Mathematical expression for FM Wave – Demodulation or detection – Essentials of AM detection – Diode detector for AM signals – FM detection.

TEXT BOOKS:

1. Mehta V.K., Rohit Mehta, Principles of Electronics, S.Chand and Company Limited, New Delhi, 2012.
   UNIT – I : 1.13 – 1.16, 6.20-6.21, 24.1 – 24.7, 24.8, 24.10
   UNIT – II : 8.8-8.10, 8.12-8.14, 8.16-8.18, 8.21-8.22,9.7-9.12
   UNIT – III: 13.1-13.14
   UNIT – IV: 14.1, 14.2, 14.4, 14.6, 14.7, 14.8, 14.10-14.14, 14.20, 17.1, 17.3 – 17.7
   UNIT – V : 16.2 – 16.15
2. Theraja B.L., Basic Electronics, S.Chand and Company Limited, New Delhi, 2012.
   UNIT – IV: 31.18 – 31.31
   UNIT – V: 30.20 – 30.25, 30.27 – 30.30, 30.32

REFERENCE:

Malvino, Electronic Principles, 3rd Edition, Tata McGraw – Hill Publishing Company, 1984.

Core Subject **ATOMIC PHYSICS** **Code: 172103502**
SEMESTER V **5 Hrs/Week**
Credits 5

Objectives:-

- ***To understand the basic concepts related to atom models and spectrographs.***
- ***To acquire knowledge in the theory of relativity.***

UNIT – I: **[12 Hrs]**

Positive Rays: Discovery – Properties – Positive ray analysis – Thomson's Parabola method – Aston's mass spectrograph – Bainbridge Mass spectrograph – Dempster's mass spectrograph – Mass defect and packing fraction – Polarization of X-rays – Scattering of X-rays (Thomson's formula) – Failure of Classical Mechanics.

UNIT – II: **[12 Hrs]**

Structure of the Atom: The Bohr atom model: Basic postulates - The Bohr formulae - Calculation of total energy - Bohr's interpretation of the hydrogen spectrum - Spectral series of hydrogen atom - The energy level diagram. Critical Potentials – Atomic excitations – Sommerfield's relativistic model: Elliptic orbits for hydrogen - Total energy - Sommerfield's relativistic theory - Fine structure of H_α line. Vector atom model – Quantum numbers associated with Vector atom model – Coupling schemes (LS, jj coupling) – Pauli's exclusion principle – Periodic classification of elements – Some examples of electron configurations with their modern symbolic representations.

UNIT – III: **[12 Hrs]**

Atomic Spectra: Magnetic dipole moment due to orbital motion of the electron – Magnetic dipole moment due to spin – The Stern and Gerlach experiment – Optical spectra: Spectral terms – Spectral notation – Selection rules – Fine Structure of the sodium D line. Zeeman Effect: Experimental arrangement - Lorentz classical theory - Expression for the Zeeman shift – Larmor's theorem – Quantum mechanical explanation of the normal Zeeman effect – Stark effect: Experimental study – Results.

UNIT – IV: **[12 Hrs]**

X-ray Spectra and Photoelectric Effect: X-ray Spectra: X-ray Spectra – Characteristics X-ray spectrum – Mosley's law (Statement, Explanation and Importance) – Compton Effect - Expression for change in wavelength - Compton shift.

Photoelectric Effect: Introduction – Lenard's method to determine e/m for photoelectrons -Richardson and Compton experiment - Relation between photoelectric current and retarding potentials - Relation between velocity of photo electrons and the frequency of light – Experimental investigations on the photoelectric effect-Laws of photoelectric emission - Failure of electromagnetic theory – Einstein's photoelectric equation - Experimental verification - Millikan's

experiment - Photoelectric cells – Photo-emissive cell – Photo-voltaic cell - Photoconductive cell - Applications of photoelectric cells.

UNIT – V: **[12 Hrs]**

Theory of Relativity: Introduction - Frame of reference – Newtonian relativity – Galilean transformation equations – The ether hypothesis – The Michelson-Morley experiment – Special theory of relativity – Lorentz transformation equations – Length contraction – Time dilation – Relativity of simultaneity – Addition of velocities – Variation of mass with velocity – Mass-energy equivalence – Minkowski's four dimensional space – Time continuum – The general theory of relativity.

TEXT BOOK:

Murugeshan R., Kiruthiga Sivaprasath; Modern Physics, S.Chand and Co. Pvt. Ltd., 17th Revised Edition

UNIT I : Chapter 5. Sections 5.1 - 5.9; 5.11.

UNIT II : Chapter 6. Sections 6.4; 6.8; 6.9; 6.11 - 6.17.

UNIT III : Chapter 6. Sections 6.18 - 6.20; 6.22 - 6.25; 6.28.

UNIT IV : Chapter 7. Sections 7.11 - 7.14.

: Chapter 8.

UNIT V : Chapter 1. Sections 1.1 - 1.16.

REFERENCE BOOKS:

1. Shegal, Chopra and Shegal, Modern Physics, 9th revised edition(2004), S.Chand and Sons.
2. B.L.Theraja, Modern Physics, 9th edition (1984), S.Chand and Co. Ltd.
3. H.S.Mani and G.K.Metha, Introduction to Modern Physics, Affliated East-West Pvt. Ltd., 1991.

Core Subject **SOLID STATE PHYSICS** **Code: 172103503**

SEMESTER V **5 Hrs/Week**

Credits 5

Objectives:-

- ***To understand the crystal structure and properties***
- ***To study the crystal imperfections and lattice vibrations***

UNIT – I: **[12 Hrs]**

Basic concepts of crystallography: Lattice points and space lattice- Basis- unit cell - Bravais lattice: Seven Crystal system – Types of space lattices – Fourteen Bravais lattices – Unit cell dimensions of 14 Bravais lattices – Diagramatic representations of 14 Bravais lattices – Crystal structures: Simple cubic (SC) structure – Body centered cubic (BCC) structure – Face centered cubic (FCC) structure – Hexagonal close packed (HCP) structure.

UNIT – II: **[12 Hrs]**

X-ray diffraction: Introduction – Bragg's law: Bragg's law and crystal structure – Experimental methods of x-ray diffraction: The Laue method of x-ray diffraction – Reciprocal lattice – Interpretation of Bragg's law – van Laue equations – The Rotating crystal method – The powder method (Debye-Scherrer method).

UNIT – III: **[12 Hrs]**

Primary bonds: Ionic or electrovalent bond – Cohesive energy in ionic solids – Covalent bond – Metallic bond – Secondary bonds: van der Walls bond – Hydrogen bond – Bond Energy – Bond length.

UNIT – IV: **[12 Hrs]**

Crystal imperfections: Introduction –Point defects – lattice vacancies and interstitial atoms-Schottky defect- Frenkel defect- Line defects – edge dislocations-Burgers vector and screw dislocation- Super conductivity - Introduction - Properties of super conductors.

UNIT – V: **[12 Hrs]**

Lattice vibrations: Phonons – Vibrations of monoatomic one dimensional lattice – Vibrations of diatomic one dimensional lattice – Specific heat capacity of solids: Basic definitions – Dulong and Petit's law – Classical theory of specific heat capacity – Einstein's theory of specific heat – Debye's theory specific heat.

TEXT BOOKS:

1. Ilangovan K, Solid State Physics, MJP Publishers, Chennai –2013.
   UNIT – I: Chapter – I – Section 1.2, 1.3, 1.5, 1.6
   UNIT – II: Chapter – II – Section 2.1, 2.2, 2.3
   UNIT – III: Chapter – III – Section 3.2, 3.3, 3.4, 3.5, 3.6,
   UNIT - IV: Chapter - VII – Section 7.1, 7.2
   UNIT – V: Chapter – V – Section 5.1, 5.2

2. Barua K.C., Introduction to Condensed Matter Physics, Narosa Publishing House, New Delhi.
   UNIT – IV: Chapter – III – Section 3.1,3.2, 3.4

REFERENCE BOOKS:

1. Srivastava J.P., Elements of Solid State Physics, 2nd Edition, Prentice Hall of India, New Delhi 2007.
2. Leonid. V Azaroff-., Introduction to Solids, TaTa McGraw Hill, New Delhi – 110008

Part – IV **MEDICAL PHYSICS** **Code: 174403521**
Skill Based Elective–III-Major **SEMESTER V** **2 Hrs/Week**
Credits 2

Objectives:-

- ***To understand the working principles of electronic instruments used in hospitals***
- ***To acquire knowledge about the various treatment methods using physics concepts.***

UNIT – I: **[6 Hrs]**

Introduction to electrodes and bio potentials – XRay machine – Difference between storage tube and conventional CRtube – radiographic and fluoroscopic techniques – Basic ideas of CT scanner – Applications – Mathematical basis of image construction – MRI – Parameters – MRI instrumentation.

UNIT – II: **[6 Hrs]**

Ultrasonic scanner – computer controlled ultra sonic image – Display A-B-M modes – Endoscopy Gamma Camera – Thermography.

Bio telemetry – design of efficient Bio telemetry system – Radio telemetry system – single channel Multi channel Telemetry – Patient monitoring.

UNIT – III: **[6 Hrs]**

Electric shock Hazards – Microshock Hazards – Macro shock Hazards – Patient safety – Cardiac pace maker – Circuit diagram of an On – Demand pace maker – Mode of operation – artificial heart valves

UNIT – IV: **[6 Hrs]**

Defibrillators – DC – dual Peak DC – Defibrillator – ventilators – Artificial ventilators – ventilator treatment – Nerve and muscle stimulators – diathermy – Types of Diathermy Heart – Lung machine – Anesthetic machine – Audio meters.

UNIT – V: **[6 Hrs]**

Lithotripsy – Dialysers – Types of dialyser – performance Analysis of dialysers – Laser Equipment and application- Laser instrumentation – Medical applications of Laser.

TEXT BOOK:

Bhuvaneswari.C Biomedical Instrumentation, Anuradha Publications 2nd Edition, 2011.

UNIT – I	1.2 – 1.6, 7.1 – 7.5.2
UNIT – II	7.6 – 7.10.5
UNIT – III	7,11-7.14
UNIT – IV	7.15-7.21
UNIT – V	7,22-7.24.2

REFERENCE:

Arumugam M., Biomedical Instrumentation, Anuradha Publications 2007.

Self Learning Course–Major COMMUNICATION SYSTEMS Code: 178003521
SEMESTER V Addl. Credits 4

Objectives:-

- ***To understand the fundamental concepts behind modern communication systems.***
- ***To study the basic ideas about data transmission through fiber optic cables.***

UNIT – I:

Introduction - Communications: Communications systems – Information – Transmitter – Channel – Noise – Receiver – Modulation – Description – Need for modulation – Band width requirements – Sine wave and Fourier series review – Frequency spectra of nonsinusoidal waves. Noise: External noise – Internal noise figure.

UNIT – II:

Digital Communications - Digital technology – Digital fundamentals – The binary number system – Digital electronics – Fundamentals of data communication systems – The emergence of data communications systems – Characteristics of data transmission circuits – Digital codes – Error detection and correction.

UNIT – III:

Broad Band Communications Systems - Multiplexing – Frequency – Division multiplex – Time – Division multiplex – Short and medium – Haul systems – Coaxial cables – Fiber optic links – Microwave links – Tropospheric scatter links – Long–Haul systems – Submarine cables – Satellite communications.

UNIT – IV:

Radar Systems - Basic principles – Fundamentals – Radar performance factors – Pulsed systems – Basic pulsed radar system – Other radar systems – CW Doppler radar – Frequency modulated CW radar.

UNIT – V:

The optical fiber and fiber cables – Fiber characteristics and classification – Fiber losses – Fiber optic components and systems – The source – Noise – Response time – The optical link – Light wave – The system - Fiber optic testing - Power budgeting - Passive components - Receivers.

TEXT BOOK:

Kennedy. Davis, Electronic Communication Systems, 4th Edition, Tata McGraw – Hill, 1999.

UNIT – I : Chapter 1 – 1.1 to 1.4 and Chapter 2 - 2.1 to 2.2
UNIT – II : Chapter 14 – 14.1 to 14.2
UNIT – III : Chapter 15 – 15.1 to 15.3
UNIT – IV : Chapter 16 – 16.1 to 16.2, 16.3, 16 – 3.1, 16–3.2
UNIT – V : Chapter 18 – 18.4, 18.5, 18-6.2, 18-6.3, 18-6.4, 18-6.5

REFERENCE:

Wayne Tomasi, Advanced Electronic Communications Systems, 6th Edition, Prentice Hall of India Private Limited, 2004.

Core Subject **DIGITAL ELECTRONICS** **Code: 172103601**

SEMESTER VI **5 Hrs/Week**

Credits 5

Objectives:-

- ***To acquire knowledge and skills required to design simple digital circuits.***
- ***To acquire and implement simple logic operations.***

UNIT – I: **[12 Hrs]**

Number Systems and Codes: Binary number system – Binary to decimal conversion – decimal to binary conversion – Octal numbers – Hexadecimal numbers – The ASCII code – The excess 3 code – The gray code – Binary addition – Binary subtraction – 1's complement – 2's complement – Binary multiplication and division.

UNIT – II: **[12 Hrs]**

Digital Logic and Combinational Logic Circuits: The basic gates (NOT, OR, AND) – Universal logic gates (NOR, NAND) – De-Morgan's theorems – Positive and negative logic – Boolean laws and theorems – Sum of products method – Truth table to Karnaugh map – Pairs, quads and octets – Karnaugh simplifications – Don't care conditions – Product of sums method – Product of sums simplification.

UNIT – III: **[12 Hrs]**

Data Processing and Arithmetic Circuits: Multiplexers – Demultiplexers – 1 of 16 decoder – Binary to decimal decoders – seven segment decoders – encoders – Exclusive OR gate – Parity generators and checkers – Arithmetic building blocks (Half adder, Full adder, controlled inverter) – The adder and subtractor.

UNIT – IV: **[12 Hrs]**

Flip – Flops: RS Flip-Flop – Clocked RS Flip-Flop – clocked D-Flip-Flops – positive edge and negative edge triggered RS, D, JK Flip-Flops - Flip-Flop timing – JK Master Slave Flip-Flop – Schmitt trigger - 555 timer- Astable – 555 timer- Monostable.

UNIT – V: **[12 Hrs]**

Registers and Counters: Types of Registers – serial IN – serial OUT – serial IN – parallel OUT – Parallel IN – Serial OUT – parallel IN – Parallel OUT – Application of shift registers – Counters – Asynchronous Counters – Ripple Counter – Synchronous Counters – Digital clock – D/A converter – variable register network – Binary adder – D/A accuracy and resolution – A/D converters – counters method – A/D accuracy and resolution.

TEXT BOOK:

Donald P Leach, Albert Paul Malviro, Goutam Saha, Digital Principles and Applications, 7th Edition (2011), TATA McGraw Hill Education Private Limited, New Delhi.

UNIT – I Chapter 5: Sections 5.1–5.8,6.1,6.2,6.5, 6.11

UNIT – II	Chapter 2:	Sections 2.1, 2.2, 2.4, 3.1 – 3.8.
UNIT – III	Chapter 4:	Sections 4.1 – 4.8.
	Chapter 6:	Sections 6.7, 6.8.
UNIT – IV	Chapter 8:	Sections 8.1 – 8.6, 8.8.
	Chapter 7:	Sections 7.3 - 7.5
UNIT – V	Chapter 9:	Sections 9.1 – 9.5.
	Chapter 10:	Sections 10.1, 10.3, 10.8.
	Chapter 12:	Sections 12.1,12.2,12.4,12.6, 12.10

REFERENCE BOOKS:

1. Morris Mano M., Digital Logic and Computer Design, Prentice – Hall of India Private Limited, New Delhi, 2002.
2. V.K.Puri, Digital Electronics, Circuits and Systems, Tata MCGraw Hill Education private limited, Delhi, 2010.

Core Subject NUCLEAR PHYSICS AND QUANTUM MECHANICS

SEMESTER VI **Code:172103602**

5 Hrs/Week

Credits 5

Objectives:-

- ***To understand the basic concepts and theories in nuclear physics and Quantum mechanics.***
- ***To learn some of the applications in Quantum mechanics and nuclear physics.***

UNIT – I: **[13 Hrs]**

Introduction to nucleus: Introduction-classification of Nuclei-General properties of Nucleus-Nuclear size-Nuclear mass-Nuclear density-Nuclear charge-Spin angular momentum-Nuclear magnetic dipole moments-Electric quadrupole moment-Binding energy-Packing fraction-Nuclear Stability- Theories of Nuclear composition-Proton Electron Hypothesis-Proton Neutron Hypothesis- Nuclear Forces-Meson Theory of Nuclear Forces.

Models of nuclear structure: The Liquid drop Model-Semi empirical Mass formula-The shell model-Evidences for shell model-The collective Model.

UNIT – II: **[13 Hrs]**

Radioactivity: The Discovery of Radioactivity-Natural Radioactivity - Alpha, Beta and Gamma rays-Prosperities of Alpha Rays-Properties of Beta Rays-Properties of Gamma rays-Determination of e/m of Alpha particles-Determination of the Charge of Alpha Particles-Velocity of Alpha Particles-Range of alpha particles-Experimental Measurement of the Range of Alpha particles-Alpha particle disintegration Energy-Law of Radioactive disintegration –The Mean Life-Measurement of Decay Constants-Units of Radioactivity.

UNIT – III: **[10 Hrs]**

Artificial transmutation and Nuclear Detectors: The Discovery of Artificial Transmutation-Bohr's Theory of Nuclear Disintegration-The

Q-Value Equation for nuclear reaction-Threshold energy-Nuclear reactions-Energy Balance in Nuclear Reactions and the Q-Value-Threshold Energy of an Endoergic Reaction-Ionization chamber-Geiger-Muller Counter-Diffusion Cloud Chamber.

UNIT – IV: **[12 Hrs]**

Planck's Quantum theory - The Distribution of energy in the spectrum of a black body –results - Wien's Displacement law - Planck's Hypothesis - Derivation of Planck's law of Radiation - Deductions of Wien's law and Rayleigh -Jean's law from Planck's law of radiation.

Wave Mechanics:

The de Broglie wave length - Expression for Group Velocity-Group velocity of de Broglie waves-Relation between group velocity and wave velocity - Davisson and Germer experiment - Heisenberg's Uncertainty Principle - statement - Illustrations - determination of position with Gamma ray Microscope and Diffraction of beam of electrons by a slit-Complimentarity Principle of Bohr.

UNIT – V: **[12 Hrs]**

Schrodinger's Wave equation and its applications: Basic Postulates of Wave Mechanics-Derivation of Time -dependent Form of schrodinger Equation-Steady state form of Schrödinger Equation (table independent) - Properties of the Wave Function - Physical significance of wave function - Orthogonal and Normalized wave functions - Eigen functions and Eigen values-Expectation values-The Particle in a Box - Potential step - The Barrier Penetration Problem.

TEXT BOOK:

Modern Physics – R.Murugeshan ,Er.Kiruthiga Sivaprasath-Seventeenth revised edition 2014,Publisher-S Chand and co.

Unit I -27.1- 27.12

Unit II -31.1- 31.12,31.30-31.33

Unit III -34.12- 34.6,29.3,29.6,29.8.

Unit IV -Chapter 9, Chapter 11.1-11.4.

Unit V -11.7 -11.12.

REFERENCES:

1. Elements of Quantum Mechanics-Kamal Singh and S P Singh 2006, S. Chand and co.
2. Nuclear physics –S.B. Patel-second edition-New Age International publishers, 2011.

Core Subject **PROJECT** **Code: 172103603**

SEMESTER VI **6 Hrs/Week**

Credits 5

Students have to carry out Project Works under the guidance of the members of the Physics Department during VI semester. 6 hours per week. Each batch may include three students. PROJECT Work may be chosen in any field in Physics. A mid-semester evaluation will be conducted jointly by Guide, HOD and members of the staff. 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. The viva on project work will be conducted during 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.

Internal 40 Marks		External 60 Marks	
Report	= 20	Report	= 30
Mid-semester evaluation	= 10	Viva	= 30
Viva	= 10		
Total	= 40	Total	= 60

Core Lab **PHYSICS LAB – III** **Code: 172103604**

SEMESTER V & VI **3 Hrs/Week**

Credits 3

Objectives:-

- ***To learn the usage of electrical and optical systems for various measurements.***
- ***To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.***

LIST OF EXPERIMENTS:

1. LCR – Series Resonance circuit – Determination of L & Q
2. LCR – Parallel Resonance circuit – Determination of L & Q
3. Self Inductance – By Anderson Bridge
4. Self Inductance – By Owen's Bridge
5. Self Inductance – By Maxwell Bridge
6. M1/M2 using spot galvanometer
7. Absolute capacitance of a condenser – using spot Galvanometer
8. High resistance by leakage – using spot galvanometer
9. Spectrometer - Determination of refractive index - Narrow angled prism.
10. Determination of Band Gap of thermistor
11. Determination of Boltzmann constant using a P- N junction diode.
12. Spectrometer – Determination of Hartmann's constants.
13. Spectrometer – Resolving power of a prism
14. Refractive index of a liquid – Hollow prism
15. Determination of wavelength of laser beam and slit width
16. Indexing of cubic powder pattern.

Core Lab **PHYSICS LAB – IV** **Code: 172103605**

SEMESTER V & VI **3 Hrs/Week**

Credits 3

Objective:

- ***To construct and analyze various electronic circuits such as oscillators, multivibrants and logic gates etc., to enable the students to understand the practical aspects of basic electronics theory.***

LIST OF EXPERIMENTS:

1. Zener Characteristics
2. Transistor Characteristics – CE mode
3. Single stage amplifier – CE mode
4. Bridge Rectifier with Pi section filters
5. Colpitt's oscillator – Determination of self inductance coil.
6. Hartley oscillator – Determination of self inductance coil.
7. Voltage doubler
8. Dual power supply – using IC 7812 and IC 7912
9. Astable mullivibrator using IC 555
10. Differentiator and integrator – IC 741
11. Adder and subtractor – IC 741
12. OR, NOT, AND, NAND and NOR gates using discrete components.
13. OR, NOT, AND, NAND and NOR gates using ICs.
14. Verification of DeMorgan's laws.
15. Universality of NAND and NOR gates.
16. Inverting amplifier and non inverting amplifier using IC 741.

B.Sc PHYSICS: Those who have joined in the Academic year 2017–18 onwards under CBCS System

EVALUATION PATTERN

Internal : 25 Marks **External** : 75 Marks

INTERNAL:

Test – 20 (average of the better two of the three tests conducted)
Assignment – 5

Question Paper Pattern:

INTERNAL	**EXTERNAL**
Part – A : 6 × 1 = 6	Part – A :10 × 1 = 10
(Multiple Choice)	(Multiple Choice)
Part – B : 2 × 7 = 14	Part – B : 5 × 7 = 35
(Either /Or)	(Either /Or)
Part – C : 2/3 ×10= 20	Part – C : 3/5×10 = 30
*40	75

* Internal test mark 40 will be converted to 20.

SBE & NME

INTERNAL	**EXTERNAL**
Part – A : 3 × 1 = 3	Part – A :15 × 1 = 15
(Multiple Choice)	(Multiple Choice)
Part – B : 1 × 7 = 7	Part – B : 3/5 × 10 = 30
(Either /Or)	
Part – C : 1/2 ×10= 10	Part – C : 2/4×15 = 30
20	75

The **Assignment** Component of any one of the subjects (except Non-Major Electives and other Department Papers) in the III and IV Semesters in UG COURSES (as decided by the Head of the Department on Rotation Basis) should be in the form of REPORT (as per the guidelines) on the **HANDS ON EXPERIENCE GAINED** by the students from their:

- Part-time job (or)
- Assignment (or)
- Self-Employment (or)
- Making of Hand made Products (or)
- Survey on Marketing of goods and services (or)
- Maintenance and Servicing of Equipments (or)
- How things Work (or)
- Working Principles of Toys/gadgets…. Models (or)
- Making of working Models using some Concepts

Students should maintain a work diary which should be monitored by the **course teacher** guided by a **Monitoring Committee** of the concerned department.