

MANNAR THIRUMALAI NAICKER COLLEGE
PASUMALAI, MADURAI- 625 004

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

(Re-accredited with 'A' Grade by NAAC)



B.Sc., Physics

SYLLABUS AND REGULATIONS

UNDER
CHOICE BASED CREDIT SYSTEM (CBCS)
(For those who joined during 2018-2019 and after)

Qualification for Admission

Candidate should have passed the Higher Secondary Examination conducted by the Board of Higher Secondary Education, Government of Tamil Nadu with Physics as one of the subject in Higher Secondary Education.

Duration of the Course

The Students shall undergo the prescribed B.Sc (Physics) course of study for a period of three academic years (six semesters).

Subject of Study

- Part I: Tamil
- Part II: English
- Part III:
 - 1. Core Subjects
 - 2. Allied Subjects
 - 3. Electives
- Part IV :
 - 1. Non Major Electives
 - 2. Skill Based Subjects
 - 3. Environmental Studies
 - 4. Value Education
- Part V :
 - Extension activities

The scheme of Examination

The components for continuous internal assessment are:

Two tests and their average	--15 marks
Seminar /Group discussion	--5 marks
Assignment	--5 marks
Total	--25 marks

Pattern of the questions paper for the continuous Internal Assessment

(For Part I, Part II, Part III , NME & Skilled Paper in Part IV)

The components for continuous internal assessment are:

Part –A	
Six multiple choice questions (answer all)	6 x 01= 06 Marks
Part –B	
Two questions (‘either or ‘type)	2 x 07=14 Marks
Part –C	
One question out of two	1 x 10 =10 Marks
Total	----- 30 Marks -----

Pattern of the question paper for the Summative Examinations:

Note: Duration- 3 hours

Part –A	
Ten multiple choice questions (No Unit shall be omitted; not more than two questions from each unit.)	10 x 01 = 10 Marks
Part –B	
Five Paragraph questions (‘either or ‘type) (One question from each Unit)	5 x 07 = 35 Marks
Part –C	
Three Essay questions out of five (One question from each Unit)	3 x 10 =30 Marks
Total	----- 75 Marks -----

The Scheme of Examination (Environmental Studies and Value Education)

Two tests and their average	--15 marks
Project Report	--10 marks*
Total	<u> </u> --25 marks

** The students as Individual or Group must visit a local area to document environmental assets – river / forest / grassland / hill / mountain – visit a local polluted site – urban / rural / industrial / agricultural – study of common plants, insects, birds – study of simple ecosystem – pond, river, hill slopes, etc.

Question Paper Pattern

Pattern of the Question Paper for Environmental Studies & Value Education only) (Internal)

Part –A

(Answer is not less than 150 words)

Four questions (‘either or ‘type) 4 x 05=20 Marks

Part –B

(Answer is not less than 400 words)

One question (‘either or ‘type) 1 x 10=10 Marks

Total -----
30 Marks

Pattern of the Question Paper for Environmental Studies & Value Education only) (External)

Part –A

(Answer is not less than 150 words)

Five questions (either or type) 5 x 06 =30 Marks

(One question from each Unit)

Part –B

(Answer is not less than 400 words)

Three questions out of Five 3 x 15 = 45 Marks
each unit (One question from each Unit) -----

Total 75 Marks

Minimum Marks for a Pass

40% of the aggregate (Internal +Summative Examinations).

No separate pass minimum for the Internal Examinations.

27 marks out of 75 is the pass minimum for the Summative Examinations.

PROGRAMME SPECIFIC OUTCOMES

PSO1: To equip the students with specific knowledge and skills required for higher education.

PSO2: To enable the students to know the basic concepts and to enable the students find employment in public and private sector undertakings.

PSO3: To Cover the Concepts, Definitions, Properties matter, Electricity, Electromagnetism, Astro Physics, Atomic Physics, Nuclear and Particle Physics, Digital Electronics, Material Science and Microprocessors.

PSO4: To help the students to analyze the circuit models and to design the circuit

COURSE PATTERN

Study Component	I Sem	II Sem	III Sem	IV Sem	V Sem	VI Sem	Total Hours	Total Credits	No. Of Courses	Total marks
Part –I Tamil	6(3)	6(3)	6(3)	6(3)			24	12	4	400
Part – II English	6(3)	6(3)	6(3)	6(3)			24	12	4	400
Part –III										
Core Subjects	4(4)	4(4)	4(4)	4(4)	5(5) 5(5)	5(5) 5(5)	36	36	8	800
Core Elective					4(4)	4(4)	8	8	2	200
Core Subject(P) Project	2(0)	2(2)	2(0)	2(2)	3(0) 3(0) 2(0)	3(5) 3(6) 2(4)	24	19	5	500
Allied Subject - I	6(4)	6(4)	4(4)	4(4)	-	-	20	16	4	400
Allied Subject – I (T)	4(4)	4(3)	4(4)	4(3)			16	14	4	400
Allied Subject – I (P)	2(0)	2(1)	2(0)	2(1)			8	2	2	200
Allied Subject - II (T)			4(3)	4(3)	4(3)	4(3)	16	12	4	400
Allied Subject - II (P)			2(0)	2(2)	2(0)	2(2)	8	4	2	200
Part – IV										
Skill Based Subject	2(2) 2(2)	2(2) 2(2)			2(2)	2(2)	12	12	6	600
Non Major Elective			2(2)	2(2)			4	4	2	200
EVS/ Value Education	2(2)	2(2)					4	4	2	200
Part – V										
Extension activities				0(1)			0	1	1	100
Total	30 (20)	30 (22)	30 (19)	30 (24)	30 (19)	30 (36)	180	140	44	4400

SEMESTER – III								
Subject Code	Title of the Paper	No. of Courses	Hours /Week	Credits	Maximum Marks			
					Int	Ext	Tot	
18UTAG31	Part- I Tamil Subject காப்பிய இலக்கியமும் சிறுகதையும்	1	6	3	25	75	100	For B.Sc Mathematics Students
18UENG31	Part – II English Subject Exploring Language Through Literature-III	1	6	3	25	75	100	
18UPHC31	Part-III Core Subject Optics and Spectroscopy	1	4	4	25	75	100	
18UPHCP2	Major Physics Practical – II	-	2	-	-	-	-	
18UMTA31	Part-III Allied Subject Allied Mathematics-III	1	4	4	25	75	100	
18UCHA31	Allied Chemistry – I Organic Chemistry	1	4	3	25	75	100	
18UCHAP1	Allied Chemistry Practical – I Volumetric Analysis Practical	-	2	-	-	-	-	
18UPHN31	Part-IV Non Major Elective Physics for everyday life	1	2	2	25	75	100	
	Total	6	30	19	150	450	600	

SEMESTER – IV							
Subject Code	Title of the Paper	No. of Courses	Hours/ Week	Credits	Maximum Marks		
					Int	Ext	Tot
18UTAG41	Part- I Tamil Subject பழந்தமிழ் இலக்கியமும் புதினமும்	1	6	3	25	75	100
18UENG41	Part – II English Subject Exploring Language Through Literature-IV	1	6	3	25	75	100
18UPHC41	Part-III Core Subject Atomic Physics	1	4	4	25	75	100
18UPHCP2	Major Physics Practical – II	1	2	2	40	60	100
18UMTA41	Part-III Allied Subject Allied Mathematics – IV	1	4	4	25	75	100
18UCHA41	Allied Chemistry - II Inorganic Chemistry	1	4	3	25	75	100
18UCHAP1	Allied Chemistry Practical –I Volumetric Analysis Practical	1	2	2	40	60	100
18UPHN41	Part IV –Non Major Elective Physics of Electrical Appliances	1	2	2	25	75	100
18UEAG40 – 18UEAG49	Part V- Extension Activity	1	0	1	100	-	100
	Total	9	30	24	330	570	900



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF PHYSICS
(For those who joined in 2018-2019 and after)

Programme	: UG	Part III	: Core
Semester	: III	Hours per week	: 04
Subject Code	: 18UPHC31	Credit	: 04

OPTICS AND SPECTROSCOPY

Course Outcomes

CO1: To understand the concepts in optics

CO2: To gain knowledge in geometrical and physical optics and Photoelectric effect and its applications.

CO3: To analyse the types of polarising material.

CO4: To evaluate the optical instruments.

Unit I - Geometrical optics

Equivalent focal length of a system of two thin lenses in contact- separated by a distance - Aberrations in lenses- chromatic aberration (longitudinal and lateral) - achromatic combination (lenses in contact and separated by a Finite distance). Spherical aberration – minimizing spherical aberration - crossed lens – separation by a distance- Aplanatic lens.

Unit II - Physical optics – Interference

Coherent sources-Theory of Interference fringes – Colours of thin films (Interference by Reflected light only) -Michelson’s interferometer-applications- Determination of wave length- Resolution of spectral lines-Refractive index of a gas –Fabry-Perot Interferometer-sharpness of fringes –Resolving power - Types of interference fringes – Theory of Holography and its applications.

Unit III - Diffraction

Fresnel and Fraunhofer diffraction - Zone plate -Theory-comparison with convex lens – Fraunhofer diffraction at a circular aperture - Fresnel Diffraction at a narrow rectangular aperture (Narrow slit) - concave reflection grating - Eagle mounting - Resolving power of optical instruments - Telescope, grating, prism.

Unit IV – Polarization

Double refraction - Huygens’s theory of double refraction - Nicol prism -- Theory of Production and analysis of plane, circularly and elliptically polarized light - QWP-HWP – Production and Detection of Plane, Circularly and Elliptically Polarised Light - Optical activity- Biot’s Laws – Fresnel’s theory of optical rotation – Experimental verification of Fresnel’s theory –Laurent’s Half Shade Polarimeter – Determination of Specific Rotation of Sugar Solution- Polaroids and its uses.

Unit V – Spectroscopy

Infra red Spectroscopy and Ultraviolet Spectroscopy – Sources – detection – applications – Raman effect – experimental study – Quantum theory of Raman effect - Applications. Doppler Effect in light and its applications.

Text Books:

Murugesan.R - Optics and Spectroscopy, S.Chand & company Ltd. VII Edition /2010, New Delhi.

Unit I: Chapter 1(Section 1.5, 1.6, 1.8 to 1.15)

Unit II: Chapter 2(Section 2.1,2.2, 2.3, 2.5 to 2.13)

Unit III: Chapter 3(Section3.1to 3.7, 3.12 to3.16)

Unit IV: Chapter 4(Section 4.5 to 4.21)

Unit V: Chapter 5(Section 5.1 to 5.9)

Reference Books:

1. Kakani & Bhandari Sultan – **Optics & Spectroscopy**, Chand & Sons-New Delhi.
2. Brijlal & Subramanyam. – **A text book of optics**, S.Chand & co
3. Sharma.B.K – **Spectroscopy**, GOEL Publishing House, Meerut 2006.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF PHYSICS
(For those who joined in 2018-2019 and after)

Programme : UG	Part III	: Core
Semester : III & IV	Hours per week	: 02
Subject Code : 18UPHCP2	Credit	: 02

MAJOR PHYSICS PRACTICAL – II

Course Outcomes

CO1: To develop experimental knowledge by handling various apparatus

CO2: To know the various components and its important

CO3: To know the circuit connections and functioning of experiments.

CO4: To analyse various types of measuring instruments.

Any 14 experiments.

- | | |
|--------------------------------------|--------------------------------------|
| 1. Determination of M and B_H | - Tan C method |
| 2. Laurent's Half Shade Polarimeter | - Specific rotatory power |
| 3. Determination of M | - Axial coil |
| 4. Potentiometer | - Temp. Coefficient of coil |
| 5. Potentiometer | - Comparison of EMF's |
| 6. Table Galvanometer | - Figure of merit |
| 7. Spot Galvanometer | - Figure of merit |
| 8. Spot Galvanometer | - Charge sensitiveness |
| 9. Owen's Bridge | - Determination of L |
| 10. De sauty's Bridge | - C_1/C_2 |
| 11 Spot Galvanometer | - Comparison of EMF's |
| 12. Spot Galvanometer | - Comparison of capacities |
| 13. Refractive Index of the material | - Spectrometer |
| 14. Grating | - N and λ |
| 15. Air Wedge | - Thickness of a wire |
| 16. Newton's Rings | - Radius and wavelength measurements |



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF MATHEMATICS
(For those who joined in 2018-2019 and after)

Programme : Physics	Part III	: Allied
Semester : III	Hours per week	: 04
Subject Code : 18UMTA31	Credit	: 04

ALLIED MATHEMATICS – III

Course Outcomes:

CO1: To develop the skills in formulation of LPP.

CO2: To learn about different techniques on solving LPP.

CO3: To understand Transportation and Assignment problems.

CO4: To provide the capability of solving the Commercial mathematical problems for employability.

Unit – I

Nature and Features of O.R- Modelling of O.R – General solution methods for O.R models- Scientific method in O.R- Applications of O.R

Unit– II

Linear Programming Problems- Mathematical Formulation of a LPP — Graphical solution of a LPP- Slack and Surplus variables.

Unit –III

Simplex method of solving a LPP – Concept of Duality– Formation of Dual LPP – the dual of the dual is the primal (Only Problems).

Unit –IV

Transportation Problem –Finding Initial feasible solution by North West Corner method and Vogel’s Approximation method – Optimal solution of Transportation problem.

Unit– V

Assignment problem – Solution of Assignment problems – Travelling sales man problem.

Text Books:

1. Kanti Swarup, Manmohan and Gupta, **Operations Research**, Sultan Chand Publications, 2006, New Delhi.

Unit I – From text book 1: Chapter 1

2. Dr. Arumugam. S and Isaac, **Topics in Operations Research** (Linear Programming)
New Gamma Publishing House, June 2012, Palayamkottai.
- | | | |
|----------|---|---|
| Unit II | – | From text book 1: Chapter 3 : Sections : 3.1 to 3.4 |
| Unit III | – | From text book 2: Chapter 3:Sections: 3.5 to 3.10 |
| Unit IV | – | From text book 2: Chapter 4 : Sections 4.1 and 4.2 |
| Unit V | – | From text book 2: Chapter 5 : Sections 5.1 and 5.2 |

Reference books:

1. Gupta. R.K, **Operations Research**, Krishna Prakash Mandir, Second Edition, 1988, Meerut.
2. Kanti Swarup , Gupta. P.K and Man Mohan, **Introduction to Operations Research**,
Sultan Chand and sons Publications, August 1997, New Delhi.
3. Kalavathy. S, **Operations Research** (2nd edition), Vikas Publishing House, 2002, New Delhi.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF CHEMISTRY
(For those who joined in 2018-2019 and after)

Programme	: B.Sc (Physics)	Part III	: Allied
Semester	: III	Hours per week	: 04
Sub code	: 18UCHA31	Credit	: 03

Allied Chemistry – I
ORGANIC CHEMISTRY

Course Outcomes

CO1: To gain knowledge about carbohydrates

CO2: To gain the basic knowledge of halogen compounds and dyes

CO3: To understand about the types of organic reactions

CO4: To gain knowledge in stereoisomerism.

Unit – I CARBOHYDRATES

1. Carbohydrates – Definition – Classification – Mono saccharides – Properties and uses of glucose and fructose – Structure of glucose and fructose - Haworth structure – mutarotation – Conversion of glucose into fructose and vice versa.
2. Disaccharides – Sucrose – manufacture – Properties and uses – Structure – Distinction between glucose and fructose.
3. Poly saccharides – Starch and Cellulose (Structure only) – α -amylose – β -amylose – difference between these two.

Unit – II HALOGEN COMPOUNDS

1. Aliphatic halogen compounds – preparation properties and uses of ethyl iodide, chloroform, iodoform and carbon tetrachloride.
2. Aromatic halogen compounds – preparation properties and uses of benzoyl chloride and chloro benzene.
3. Mechanism of aliphatic substitution S_N^1 , S_N^2 illustration with examples – differences – Saytzeff and Hofmann rules.

Unit – III DYES

Dyes – Definition – theory of colour and constitution – classification of dyes according to the structure and their mode of applications

1. Azodyes: Preparation and uses of methyl orange and Bismark brown.
2. Triphenyl methane dyes: Preparation and uses of malachite green and crystal violet
3. Vat dyes: Preparation and uses of Indigo only
4. Phthalein dyes: Preparation and uses of phenolphthalein only

Unit – IV TYPES OF ORGANIC REACTIONS

1. Detection and estimation of nitrogen and halogens in organic compounds – empirical formula – molecular formula – structural formula – calculation of empirical formula and molecular formula from percentage composition.
2. Types of reactions: Substitution, addition, elimination – rearrangement and polymerization – Illustration with examples – Nucleophiles – Electrophiles: definition types and examples specific reactions involving these.

Unit – V STEREOISOMERISM

1. Stereoisomerism – Chiral centre, optical activity of compounds containing one or two chiral centres, R – S notation – diastereoisomers – racemisation – resolution.
2. Geometrical isomerism of maleic and fumaric acids – E – Z notation of geometrical isomers.

Text Book:

Soni.P.L, Text Book of Organic Chemistry, New Delhi (2008)

Reference Books:

1. Bahl.B.S and Arun Bahl S. Chand, Advanced Organic Chemistry (2012), New Delhi.
2. Mehta.B and Mehta.M, Organic Chemistry (E.E. Edition (2010), New Delhi.
3. P.L. Soni and HM Chawla, Organic Chemistry 29th Edition, Sultan and Chand sons, (2007), New Delhi.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF CHEMISTRY

(For those who joined in 2018-2019 and after)

Programme	: B.Sc (Physics)	Part III	: Allied
Semester	: III & IV	Hours per week	: 02
Sub code	: 18UCHAP1	Credit	: 02

**Allied Chemistry Practical – I
VOLUMETRIC ANALYSIS (Practical)**

Course Outcomes:

CO1: To enable the students to develop skill in Acidimetry.

CO2: To gain know in Alkalimetry.

CO3: To gain knowledge in Permanganometry.

CO4: To know about the knowledge of Iodimetry.

1. Estimation of Sodium Hydroxide
(Na_2CO_3 X HCl X NaOH)
2. Estimation of Hydrochloric Acid
($\text{H}_2\text{C}_2\text{O}_4$ X NaOH X HCl)
3. Estimation of Oxalic Acid
(FAS / FeSO_4 X KMnO_4 X $\text{H}_2\text{C}_2\text{O}_4$)
4. Estimation of Ferrous Sulphate
($\text{H}_2\text{C}_2\text{O}_4$ X KMnO_4 X FeSO_4)
5. Estimation of KMnO_4
($\text{K}_2\text{Cr}_2\text{O}_7$ X FAS X KMnO_4)
6. Estimation of Sodium Hydroxide
(KMnO_4 X $\text{H}_2\text{C}_2\text{O}_4$ X NaOH)
7. Estimation of $\text{K}_2\text{Cr}_2\text{O}_7$
(KMnO_4 X FAS X $\text{K}_2\text{Cr}_2\text{O}_7$)
8. Estimation of Na_2CO_3
(NaHCO_3 X HCl X Na_2CO_3)
9. Estimation of Iodine
(KMnO_4 x Thio x Iodine)

INTERNAL = 40 MARKS

EXTERNAL = 60 MARKS



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF PHYSICS

(For those who joined in 2018-2019 and after)

Programme : UG	Part IV	: NME
Semester : III	Hours per week	: 02
Subject Code : 18UPHN31	Credit	: 02

PHYSICS FOR EVERYDAY LIFE

Course Outcomes

CO1: To enable the students to understand the basic concepts of Physics

CO2: To gain Knowledge about different types of energy

CO3: To study the concept of light and its applications

CO4: To analyse the light properties

Unit – I Physical Quantities

SI units - Distance - Displacement – Speed – Velocity - Uniform and variable velocity - Acceleration and Retardation - Force – Translational motion and rotational motion – Centrifugal and Centripetal force with examples.

Unit – II Light

Reflection – Refraction – Lenses – Concave and Convex lens - Difference between concave and convex lenses - Focal length – Power of a lens – Application of lenses – Prism - Scattering of light – Applications of scattering.

Unit – III Sound

Sound waves – Ultrasonic and infrasonic (definition only) – Amplitude, time period, frequency and wavelength (definition only) – Properties of the sound waves - Reflection of sound waves – Echo – Use of Echoes by sonar - Use of Echoes in Medical field.

Unit – IV Heat

Concept of heat – Unit of heat – Concept of temperature – Unit of temperature – Difference between Heat and temperature – Thermometer – Liquid thermometer – Celsius thermometer – Fahrenheit thermometer – Clinical thermometer – Factors Affecting the Quantity of Heat.

Unit – V Energy

Energy – Potential, mechanical, solar, heat, light, chemical, electrical, sound and wind energy - Conversion - Mechanical energy to electrical energy - Electrical energy to heat energy - Electrical energy to sound energy - Electrical energy to light energy - Electrical energy to chemical energy - Chemical energy to mechanical energy.

Text Book

Material will be compiled by the Department

Reference Books

1. Mathur. D.S, **Mechanics** S. Chand & Co.2002
2. Haliday.D, Resnick and Walker.J, **Fundamental of physics** 6th Edition
3. Kakani & Bhandari Sultan - **Optics & Spectroscopy**, Chand & Sons- New Delhi.
4. Brijlal & subramanyam.– **A text book of optics**, S.Chand &co
5. Narayanamoorthy & Nagarathinam -**Electricity & Magnetism** – National Publishing Co. 1997



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF PHYSICS
(For those who joined in 2018-2019 and after)

Programme : UG	Part III	: Core
Semester : IV	Hours per week	: 4
Subject Code : 18UPHC41	Credit	: 4

ATOMIC PHYSICS

Course Outcomes

- CO1:** To understand the atomic structure and different energy levels
CO2: To understand the splitting of spectral lines and X – ray diffraction
CO3: To understand the photoelectric effect and black body radiation
CO4: To study the dual nature of material particles

Unit I – Atom Models

Introduction – Rutherford’s experiments on scattering of α -particles – Bohr atom model (no derivation) – application of Bohr’s theory – critical potentials – atomic excitation – Sommerfeld’s relativistic atom model – elliptical orbits – relativistic variation of atomic masses – application to fine structure of spectral lines – vector atom model – spatial quantization – spinning electron hypothesis.

Unit II – Atomic Structure

Quantum numbers – coupling schemes – The Pauli’s exclusion principle – electron configurations – magnetic dipole moment due to orbital and spin motion of the electron – Stern and Gerlach experiment – spin-orbit coupling –optical spectra – Zeeman effect – Larmor’s theorem – stark effect – electronic structure of atom – quantum mechanical explanation of the normal Zeeman effect – anomalous Zeeman effect – Paschen-back effect –its types – normal Zeeman effect – theory and experiment.

Unit III – X-ray Diffraction

X rays – production – Coolidge tube – spacing between three dimensional lattice planes - Bragg’s law – Bragg’s X-ray spectrometer – The powder crystal method – (a) The Laue method – (b) Rotating-crystal method – X-ray spectra – Characteristics X-rays spectrum – Moseley’s law and its importance – Compton effect – Theory and experiment.

Unit IV – Photo Electric Effect

Introduction – Experimental investigation on the photoelectric effect – Laws of photo electric effect – Einstein’s photo electric equation – Photoelectric cells – photo-emissive cell – photo-voltaic cell – photoconductive cell – Planck’s theory of black body radiation – Theory and experiment.

Unit V – Dual Nature of Matter Particles

Introduction – De Broglie’s hypothesis of matter waves - De Broglie’s wave length – phase velocity (or wave velocity) of De Broglie’s waves – Expression for group velocity – relation between them – G.P.Thomson experiment of study of matter waves – Heisenberg’s uncertainty principle with the illustration of diffraction of electron through a single slit.

Text book:

1. Murugesan.R, Er.Kiruthiga Sivaprasath, **Modern Physics**, S.Chand, 17th Revised Edition, 2014, New Delhi.

UNIT I: Chapter 6 (6.1, 6.2, 6.4, 6.8, 6.9, 6.11, 6.12).

UNIT II: Chapter 6 (6.13, 6.14, 6.15, 6.17, 6.18, 6.19, 6.20, 6.21, 6.22, 6.23, 6.24, 6.25, 6.26, 6.27, 6.28).

UNIT III: Chapter 7 (7.1, 7.2, 7.3, 7.6, 7.7, 7.8, 7.9(a & b), 7.11, 7.12, 7.13, 7.14)

UNIT IV: Chapter 8 (8.1, 8.4, 8.5, 8.6(i, ii & iii), Chapter 9

UNIT V: Chapter 11(11.1,11.2,11.3,11.4)

Reference Books:

1. Rajam.J.B, Atomic **Physics**, S.Chand and Co, 2004, New Delhi.
2. Seghal Chopra and Seghal Sultan **Modern Physics**, S.Chand and Co, 1998, New Delhi.
3. Saxena.A.K Principles of Modern Physics, Narosa Publishing House Pvt, Ltd., Fourth Edition, 2014.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF PHYSICS
(For those who joined in 2018-2019 and after)

Programme : UG	Part III	: Core
Semester : III & IV	Hours per week	: 02
Subject Code : 18UPHCP2	Credit	: 02

MAJOR PHYSICS PRACTICAL – II

Course Outcomes

CO1: To develop experimental knowledge by handling various apparatus

CO2: To know the various components and its important

CO3: To know the circuit connections and functioning of experiments.

CO4: To analyse various types of measuring instruments.

Any 14 experiments.

- | | |
|--------------------------------------|--------------------------------------|
| 1. Determination of μ and B_H | - Tan C method |
| 2. Laurent's Half Shade Polarimeter | - Specific rotatory power |
| 3. Determination of μ | - Axial coil |
| 4. Potentiometer | - Temp. Coefficient of coil |
| 5. Potentiometer | - Comparison of EMF's |
| 6. Table Galvanometer | - Figure of merit |
| 7. Spot Galvanometer | - Figure of merit |
| 8. Spot Galvanometer | - Charge sensitiveness |
| 9. Owen's Bridge | - Determination of L |
| 10. De sauty's Bridge | - C1/C2 |
| 11 Spot Galvanometer | - Comparison of EMF's |
| 12. Spot Galvanometer | - Comparison of capacities |
| 13. Refractive Index of the material | - Spectrometer |
| 14. Grating | - N and λ |
| 15. Air Wedge | - Thickness of a wire |
| 16. Newton's Rings | - Radius and wavelength measurements |



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF MATHEMATICS
(For those who joined in 2018-2019 and after)

Programme	: Physics	Part III	: Allied
Semester	: IV	Hours per week	: 04
Sub code	: 18UMTA41	Credit	: 04

ALLIED MATHEMATICS – IV

Course Outcomes

CO1: To develop logical skills in solving the differential equations.

CO2: To introduce the concepts of an analytic function.

CO3: To familiarize bilinear transformations.

CO4: To familiarize the applications on skill development.

Unit – I:

Exact Differential Equation – Second Order Differential Equations.

Unit –II:

Second Order Equation with RHS x^n , e^{ax} , $\sin ax$, $\cos ax$, $e^{ax} \sin ax$, $e^{ax} \cos bx$.

Unit –III:

Laplace Transforms– Solution of Differential Equation using Laplace Transforms.

Unit –IV:

Analytic Functions – Properties – C– R equations.

Unit – V:

Bilinear Transformations – Cross Ratio.

Text Books:

1. Dr. Arumugam. S, **Ancillary Mathematics Volume III**, New Gamma publishing House, July 2009, Palayamkottai.

Unit I – Chapter 1 : Section 1.3 & 1.5

Unit II – Chapter 2 : Section 2.1 to 2.3

Unit III – Chapter 3 : Full

Unit IV – Chapter 6 : Full

Unit V– Chapter 7 : Full

Reference books:

1. Narayanan.S and Manicavasagam Pillai.T.K., **Differential Equation and its Application**,
Viswanathan.S, Printers and Publishers Pvt. Ltd., Reprint 2006, Chennai.
2. Duraipandian.P and Dr. Udaya Baskaran.S, **Allied Mathematics Volume II**,
S.Chand and Company LTD, Revised edition 2008, New Delhi.
3. Dr. Arumugam. S, **Complex Analysis**, Scitech Publication, reprint, June 2004, Chennai.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF CHEMISTRY
(For those who joined in 2018-2019 and after)

Programme	: B.Sc (Physics)	Part III	: Allied
Semester	: IV	Hours	: 04
Sub code	: 18UCHA41	Credit	: 03

Allied Chemistry – II
INORGANIC CHEMISTRY

Course Outcomes:

- CO1:** To have a basic knowledge in Periodic table
CO2: To understand the basic knowledge of Hydrides, Oxides and Nuclear Chemistry
CO3: To know about coordination compounds
CO4: To obtain knowledge in Nuclear Chemistry

Unit – I PERIODIC TABLE AND ATOMIC PROPERTIES

Modern periodic table – salient features – classification and characterization of s,p,d and f block elements – periodicity – cause – atomic properties – atomic radii and ionic radii – their periodic trends – ionization energy – factors determining ionization energy – periodic trends – electron affinity – periodic trends – electro negativity – factors determining electro negativity and their periodic trends – applications of electro negativity.

Unit – II CHEMICAL BONDING

V.B. Theory – Postulates of V.B Theory – Application to the formation of simple molecules like H₂ and O₂ – overlap of atomic orbitals – s-s, p-p and s-p overlap – principle of hybridization – sp, sp² and sp³ hybridization – VSEPR theory. Molecular orbital theory –MO diagram of H₂, He₂, N₂, O₂ & F₂ molecules

Unit – III HYDRIDES AND OXIDES

1. Hydrogen – Isotopes of Hydrogen - ortho and para hydrogen – hydrides – definition, classification – examples.
2. Oxides – definition – classification – examples.
3. Structures of ionic crystals – Close packing – structure of NaCl, ZnS, CsCl, CaF₂ and TiO₂.

Unit – IV CO ORDINATION COMPOUNDS

1. Definition – nomenclature-definition of various terms involved in coordination chemistry – Werner's theory – EAN rule – VB theory (outline only) – Nickel carbonyl – chelates.
2. Nitrogen compounds: Manufacture of ammonia and nitric acid – physic chemical principles involved in the manufacture of ammonia.

Unit – V NUCLEAR CHEMISTRY

1. Composition of Nucleus – Nuclear forces- Mass defect – binding energy – Nuclear stability – comparison of Alpha, Beta and Gamma rays
2. Soddy's group displacement law – Illustration – law of radioactive disintegration
3. Nuclear Fission: Definition – Principle of atom bomb – Nuclear fusion – Definition – Principle of hydrogen bomb – Comparison of Nuclear Fission and Fusion – Radioactive isotopes — radiocarbon dating technique – Applications of radioactivity.

Text Book:

Puri.B.R, L.R. Sharma and Kalia.KC, Principles of Inorganic Chemistry Mile Stone Publisher 31st Edition, (2011-12), New Delhi.

Reference Books:

1. Puri, Sharma and Kalia, Principles of Inorganic Chemistry Mile Stone Publisher and Distributor, (2009), New Delhi.
2. Madan.R.D , S Chand, Modern Inorganic Chemistry band Co-Ltd., (2012), New Delhi.
3. Lee.J.D, Wiley India, Concise Inorganic Chemistry 5th Edition, (2009), New Delhi.



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)

DEPARTMENT OF CHEMISTRY

(For those who joined in 2018-2019 and after)

Programme	: B.Sc (Physics)	Part III	: Allied
Semester	: III & IV	Hours per week	: 02
Sub code	: 18UCHAP1	Credit	: 02

**Allied Chemistry Practical – I
VOLUMETRIC ANALYSIS (Practical)**

Course Outcomes:

CO1: To enable the students to develop skill in Acidimetry.

CO2: To gain know in Alkalimetry

CO3: To gain knowledge in Permanganometry

CO4: To know about the knowledge of Iodimetry.

1. Estimation of Sodium Hydroxide
(Na_2CO_3 X HCl X NaOH)
2. Estimation of Hydrochloric Acid
($\text{H}_2\text{C}_2\text{O}_4$ X NaOH X HCl)
3. Estimation of Oxalic Acid
(FAS / FeSO_4 X KMnO_4 X $\text{H}_2\text{C}_2\text{O}_4$)
4. Estimation of Ferrous Sulphate
($\text{H}_2\text{C}_2\text{O}_4$ X KMnO_4 X FeSO_4)
5. Estimation of KMnO_4
($\text{K}_2\text{Cr}_2\text{O}_7$ X FAS X KMnO_4)
6. Estimation of Sodium Hydroxide
(KMnO_4 X $\text{H}_2\text{C}_2\text{O}_4$ X NaOH)
7. Estimation of $\text{K}_2\text{Cr}_2\text{O}_7$
(KMnO_4 X FAS X $\text{K}_2\text{Cr}_2\text{O}_7$)
8. Estimation of Na_2CO_3
(NaHCO_3 X HCl X Na_2CO_3)
9. Estimation of Iodine
(KMnO_4 x Thio x Iodine)

INTERNAL = 40 MARKS

EXTERNAL = 60 MARKS



MANNAR THIRUMALAI NAICKER COLLEGE (Autonomous)
DEPARTMENT OF PHYSICS
(For those who joined in 2018-2019 and after)

Programme : UG	Part IV	: NME
Semester : IV	Hours per week	: 02
Subject Code : 18UPHN41	Credit	: 02

PHYSICS OF ELECTRICAL APPLIANCES

Course Outcomes

- CO1:** To gain Knowledge about Conductors insulators semiconductors
- CO2:** To study simple parallel and series circuits using theorems
- CO3:** To understand the working and application of electronics components.
- CO4:** To evaluate household consumption of electrical energy.

Unit – I Current electricity

Concept of charge, current, potential and potential difference – Concept of resistance - Ohm’s law (statement only) – Measuring instruments – Ammeter, voltmeter only.

Unit – II Conductivity

Conductors insulators semiconductors (definitions only) - Factors affecting the resistance of the conductors – Conductivity - Choice of material of a wire – Super conductors and its applications.

Unit – III Circuit Analysis

Combination of resistors series and parallel –Electrical energy and power (definition) Measurement of electrical energy - Commercial unit of electrical energy – Power rating of common electrical appliances – Household consumption of electrical energy.

Unit – IV Power transmission

Block diagram of transmission of electricity from power generating station to the consumes - Power distribution to a house – Connections of electrical appliances with the mains – Advantages of connecting the appliances in parallel – Disadvantages of connecting the appliances in series.

Unit – V House wiring

Essential components of house wiring system – Fuse –Reason for connecting the fuse - Miniature circuit breaker (MCB) – Switches – Reason for connecting the switch – Earthing – Local earthing – Earthing of an appliance - Socket.

Text Book:

Material will be compiled by the Department

Reference Books:

1. Sedha.R.S, **Applied Electronics**, S.Chand & Company Ltd, first Edition, 1990, New Delhi
2. Santiram Kal, **Basic Electronics: Devices, Circuits and It Fundamentals**, PHI Learning Pvt. Ltd, First Edition, 2002, New Delhi.
3. Harish C Roy, **Industrial and Power Electronics**, Umesh Publications, 10th edition, 2002, New Delhi.