

**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

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Total		30 Marks
		-----

Pattern of the question paper for the Summative Examinations:

**Note: Duration- 3 hours**

**Part –A**

Ten multiple choice questions 10 x 01 = 10 Marks  
 (No Unit shall be omitted; not more than two questions from each unit.)

**Part –B**

Five Paragraph questions (‘either .... or ‘type) 5 x 07 = 35 Marks  
 (One question from each Unit)

**Part –C**

Three Essay questions out of five 3 x 10 =30 Marks  
 (One question from each Unit)

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Total		75 Marks
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**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  
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**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  
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**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
<b>Allied Subject – I (T)</b>	<b>4(4)</b>	<b>4(3)</b>	<b>4(4)</b>	<b>4(3)</b>			<b>16</b>	<b>14</b>	<b>4</b>	<b>400</b>
<b>Allied Subject – I (P)</b>	<b>2(0)</b>	<b>2(1)</b>	<b>2(0)</b>	<b>2(1)</b>			<b>8</b>	<b>2</b>	<b>2</b>	<b>200</b>
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
<b>Total</b>	<b>30 (20)</b>	<b>30 (22)</b>	<b>30 (19)</b>	<b>30 (24)</b>	<b>30 (19)</b>	<b>30 (36)</b>	<b>180</b>	<b>140</b>	<b>44</b>	<b>4400</b>

**SEMESTER – I**

Subject Code	Title of the Paper	No. of Courses	Hours/ Week	Credits	Maximum Marks		
					Int	Ext	Tot
18UTAG11	<b>Part- I Tamil Subject</b> தற்கால கவிதையும் உரைநடையும்	1	6	3	25	75	100
18UENG11	<b>Part – II English Subject</b> Exploring Language Through Literature-I	1	6	3	25	75	100
18UPHC11	<b>Part-III Core Subject</b> Properties of matter, Thermodynamics and Acoustics	1	4	4	25	75	100
18UPHCP1	Major Physics Practical - I	-	2	-	-	-	-
18UMTA11	<b>Part-III Allied Subject</b> Allied Mathematics – I	1	6	4	25	75	100
18UPHA11	<b>Allied Physics – I</b> Mechanics, Properties of Matter and Relativity	1	4	4	25	75	100
18UPHAP1	Allied Physics Practical - I	-	2	-	-	-	-
18UPHS11	<b>Part-IV Skill Subject</b> Basic Instrumentation	1	2	2	25	75	100
18UPHS12	Basics of C Programming	1	2	2	25	75	100
18UEVG11	<b>Part-IV Mandatory Subject</b> Environmental Studies	1	2	2	25	75	100
	<b>Total</b>	<b>7</b>	<b>30</b>	<b>20</b>	<b>175</b>	<b>525</b>	<b>700</b>

For B.Sc  
Mathematics  
Students

**SEMESTER – II**

Subject Code	Title of the Paper	No. of Courses	Hours/ Week	Credits	Maximum Marks		
					Int	Ext	Tot
18UTAG21	<b>Part- I Tamil Subject</b> பக்தி இலக்கியமும் நாடகமும்	1	6	3	25	75	100
18UENG21	<b>Part – II English Subject</b> Exploring Language Through Literature-II	1	6	3	25	75	100

18UPHC21	<b>Part-III Core Subject</b> Electricity and Magnetism	1	4	4	25	75	100	<b>For B.Sc Mathematics Students</b>
18UPHCP1	Major Physics Practical - I	1	2	2	40	60	100	
18UMTA21	<b>Part-III Allied Subject</b> Allied Mathematics – II	1	6	4	25	75	100	
<b>18UPHA21</b>	<b>Allied Physics – II</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>25</b>	<b>75</b>	<b>100</b>	
<b>18UPHAP1</b>	<b>Thermal Physics and Sound Allied Physics Practical - I</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>40</b>	<b>60</b>	<b>100</b>	
18UPHS21	<b>Part-IV Skill Subject</b> Basic Photography	1	2	2	25	75	100	
18UPHSP1	Programming in C - Lab	1	2	2	40	60	100	
18UVLG21	<b>Part-IV Mandatory Subject</b> Value Education	1	2	2	25	75	100	
	<b>Total</b>	<b>8</b>	<b>30</b>	<b>22</b>	<b>230</b>	<b>570</b>	<b>800</b>	

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



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

SEMESTER – V							
Subject Code	Title of the Paper	No. of Courses	Hours /Week	Credits	Maximum Marks		
					Int	Ext	Total
18UPHC51	<b>Part-III Core Subject</b> Classical and Statistical Mechanics	1	5	5	25	75	100
18UPHC52	Analog Electronics	1	5	5	25	75	100
<b>18UPHE51</b>	<b>Part III: Elective Subject</b> Nuclear Physics	1	4	4	25	75	100
<b>18UPHE52</b>	Condensed Matter Physics	1	4	4	25	75	100
<b>18UPHE53</b>	Astrophysics	1	4	4	25	75	100
18UPHCP3	Non-Electronics Practical	--	3	--	--	--	--
18UPHCP4	Electronics Practical	--	3	--	--	--	--
18UPHPR1	Project	--	2	--	--	--	--
18UCHA51	<b>Part-III Allied Subject</b> Allied Chemistry – III Physical Chemistry	1	4	3	25	75	100
18UCHAP2	Allied Chemistry Practical-II Organic Analysis	--	2	--	--	--	--
18UPHS51	<b>Part-IV Skill Subject</b> Gemology	1	2	2	25	75	100
	<b>Total</b>	<b>5</b>	<b>30</b>	<b>19</b>	<b>125</b>	<b>375</b>	<b>500</b>

<b>SEMESTER – VI</b>							
Subject Code	Title of the Paper	No. of Courses	Hours/ Week	Credits	Maximum Marks		
					Int	Ext	Total
18UPHC61	<b>Part-III Core Subject</b> Quantum Mechanics and Relativity	1	5	5	25	75	100
18UPHC62	Digital Electronics	1	5	5	25	75	100
<b>18UPHE61</b>	<b>Part III: Elective Subject</b> Nanophysics	1	4	4	25	75	100
<b>18UPHE62</b>	Medical Instrumentation	1	4	4	25	75	100
<b>18UPHE63</b>	Optoelectronics and Fibre optic communication	1	4	4	25	75	100
18UPHCP3	Non - Electronics Practical	1	3	5	40	60	100
18UPHCP4	Electronics Practical	1	3	6	40	60	100
18UPHPR1	Project	1	2	4	40	60	100
18UCHA61	<b>Part-III Allied Subject</b> Allied Chemistry – IV Applied and Analytical Chemistry	1	4	3	25	75	100
18UCHAP2	Allied Chemistry Practical-II Organic Analysis	1	2	2	40	60	100
18UPHS61	<b>Part-IV Skill Based</b> Basics in Microprocessors	1	2	2	25	75	100
	<b>Total</b>	<b>9</b>	<b>30</b>	<b>36</b>	<b>285</b>	<b>615</b>	<b>900</b>



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

**Class : B.Sc., ( Physics)**  
**Semester : I**  
**Subject Code : 18UPHC11**

**Part III : Core**  
**Hours : 4**  
**Credits : 4**

**PROPERTIES OF MATTER, THERMODYNAMICS AND ACOUSTICS**

**Course Outcomes:**

**CO1: To enable the students to understand the basic concepts of properties of matter.**

**CO2: To enable the students to understand the basic concepts of heat.**

**CO3: To understand Ultrasonic waves and its applications Acoustics of Buildings and sound distribution system.**

**CO4: To develop the skill in the area of properties of matter and Thermodynamics.**

**Unit – I Elasticity**

Stress, Strain, Hooke's law – Different moduli of Elasticity – Young's modulus(E), Bulk modulus(K) and Rigidity modulus(G) – Poisson's ratio – Bending of beams – Expansion for Bending moment – Determination of Young's modulus by uniform and non-uniform bending – Couple per unit twist – Torsional oscillations of the body – Determination of Rigidity modulus by Torsional pendulum.

**Unit – II Surface Tension**

Definition – Unit and dimensions – Explanation of Surface Tension on Kinetic theory – Angle of contact – Pressure difference across a liquid surface – Excess pressure inside a liquid drop and soap bubble – Excess pressure inside a synclastic and anticlastic surface(curved liquid surface). Determination of Surface Tension by capillary rise method (Theory and experiment)

**Unit – III Viscosity**

Coefficient of viscosity – Stream line and Turbulent motion – Critical Velocity – Derivation of Poiseuille's formula – Poisson's method for determining coefficient of viscosity of a liquid – Equation of continuity. – Bernoulli's theorem – Venturimeter – Pitot's tube.

**Unit – IV Kinetic theory of gases and Thermodynamics**

Postulates of Kinetic theory of gases – Mean Free Path – Transport Phenomena – Expression for the coefficient of Viscosity, Diffusion and Thermal conductivity-Degrees of freedom – Boltzman's law of equipartition of energy-calculation of  $\gamma$  for monoatomic and diatomic gases. Thermodynamics – Zeroth law, I, II and III law of Thermodynamics(statement only) – Entropy – Change of entropy in Carnot's cycle - Change of entropy in conversion of ice into steam.

### Unit-V Ultrasonics and Acoustics

Piezo electric effect – Production of Ultrasonic waves – Piezo electric and Magnetostriction method – Detection of Ultrasonic waves – (Quartz crystal and Kundt's tube method) – Properties – Determination of velocity of Ultrasonic waves in a liquid – Applications.

Acoustics of Buildings – Reverberation and reverberation time (Definition only) – Acoustics of buildings – Factors affecting the acoustics of buildings – Sound distribution in an auditorium.

#### Text Book:

1. R. Murugesan, **Mechanics, Properties of Matter and Sound**, First edition, July 2016, Madurai.

Unit I - Section No 4.1-4.5, 4.7, 4.8, 4.10, 4.12, 4.13

Unit III - Section 5.1-5.7

2. R. Murugesan, **Mechanics and Relativity Properties of matter**, Practical Physics – I. First Edition August 2006, Madurai.

Unit II - Page No. 169-171, 174-179, 189-193

27 R. Murugesan, **THERMAL PHYSICS**, First edition June 2012, Madurai.

Unit IV - Section 6.1, 6.3-6.7, 6.9-6.11, 7.4-7.7

28 R. Murugesan, and Kiruthiga sivaprasath, **Properties of Matter and Acoustics**, First edition 2005, Reprint 2013, S.Chand, New Delhi.

Unit V - Section 5.1-5.9, 5.13-5.15

#### Reference Books:

1. D. Halliday Resnick, Jearl Walker, **Principles of physics** (9<sup>th</sup> Edition), Wiley India Pvt Ltd.,
2. D.S Mathur, **Elements of Properties of matter**, S. Chand & Co., 2004
3. Brijlal & N. Subramanyan, **Properties of matter**, S. Chand & Co., 2006.
4. D. Halliday Resnick, Jearl Walker, **Fundamental of physics**, Wiley India Pvt Ltd., 6<sup>th</sup> Edition
5. Brijlal, Subramaniyam and P.S. Hemne, **Heat, Thermodynamics and Statistical Physics**, S. Chand & Co. 2004
6. D.S. Mathur, **Heat and Thermodynamics**, S. Chand & Co. 2002.
7. R. Murugesan, **Heat and Thermodynamics**, S. Chand & Co. 2004



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**DEPARTMENT OF PHYSICS**  
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**Class : B.Sc (Physics)**  
**Semester : I & II**  
**Subject Code : 18UPHCP1**

**Part III : Core**  
**Hours : 02**  
**Credits :-**

**MAJOR PHYSICS PRACTICAL-I**

**Course Outcomes:**

**CO1: To create the practical knowledge in basic physics experiments.**

**CO2: To understand the bending of beam, compound pendulum and torsion pendulum.**

**CO3: To understand current conduction in electrical circuits.**

**CO4: To enhance the skill in the physics experiments.**

**LIST OF EXPERIMENTS**

- |   |  |
|---|--|
| 1. Young's Modulus                        | - Uniform bending (Pin & Microscope)           |
| 2. Young's Modulus                        | - Non –Uniform bending – Optic lever           |
| 3. Young's Modulus                        | - Canti lever – Pin and Microscope             |
| 4. Sonometer                              | - laws of transverse vibration                 |
| 5. Surface tension                        | - by capillary rise method                     |
| 6. Rigidity Modulus                       | - Torsion Pendulum with loads                  |
| 7. Spectrometer                           | - Refractive index of a prism                  |
| 8. Moment of Inertia                      | - Torsion Pendulum                             |
| 9. Sonometer                              | - A.C Frequency                                |
| 10. Melde's apparatus                     | - Frequency of tuning fork                     |
| 11. Thermal conductivity of Bad conductor | - Lee's disc                                   |
| 12. C.F Bridge                            | - Resistance and specific Resistance           |
| 13. Potentiometer                         | - Calibration of low range Voltmeter           |
| 14. Potentiometer                         | - Calibration of Ammeter                       |
| 15. Potentiometer                         | - Resistance and resistivity                   |
| 16. Compound Pendulum                     | - Determination of acceleration due to gravity |



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**DEPARTMENT OF PHYSICS**  
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**Class : B.Sc (Physics)**  
**Semester : I**  
**Sub code : 18UMTA11**

**Part III : Allied**  
**Hours : 06**  
**Credits : 04**

**ALLIED MATHEMATICS – I**

**Course Outcomes**

- CO1** To familiarize with the theory of equations.  
**CO2** To introduce transformation of equations.  
**CO3** To apply Newton's method and Horner's Method.  
**CO4** To provide the capability of solving the physical problems on skill development.

- Unit – I** Theory of Equation – An  $n^{\text{th}}$  degree equation has exactly  $n$  roots – Relation between the roots and the coefficients  
**Unit – II** Reciprocal Equations- Transformation of Equations  
**Unit – III** Finding the roots upto two decimals by Newton's method and Horner's Method  
**Unit – IV** Radius of curvature, Center of curvature of plane curves.  
**Unit - V** Integral calculus – Evaluation of Definite Integrals.

**Text Book:**

1. S.Arumugam, **Ancillary Mathematics Volume I**, New Gamma Publication, 1999 Reprint, Palayamkottai, 2006.

- Unit I - Chapter 1: Page No 1 to 26  
Unit II - Chapter 1 : Page No 27 to 40  
Unit III - Chapter 1: Page No 40 to 48  
Unit IV - Chapter 3: Page No 65 to 90  
Unit V - Chapter 3: Page No 91 to 113

**Reference Books :**

1. T.K .Manickavashagam Pillai and S.Narayanan, **Algebra, Volume I and II**, S.ViswanthanPrinters and Publishers Pvt Ltd, Chennai, 2009.
2. T.Kmanickavashagampillai and S.Narayanan, **Trigonometry**, S.ViswanthanPrinters and Publishers Pvt Ltd, Chennai, 2009.



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**Class : B.Sc (Physics)**  
**Semester : I**  
**Subject Code : 18UPHS11**

**Part IV : Skill**  
**Hours : 02**  
**Credits : 02**

**BASIC INSTRUMENTATIONS**

**Course Outcomes:**

- CO1: To enable the students to understand the basic concepts of instruments.**  
**CO2: To understand the working principles of basic measuring instruments in physics.**  
**CO3: To develop the skill of handling the basic instruments.**  
**CO4: Knowledge in Basic Instrumentation gives the Job Opportunity.**

**Unit –I**

Telescope – Astronomical and Terrestrial – Microscope – Compound and Ultra,  
Spectrometer – Construction and application.

**Unit – II**

DC motors – Construction and working principle – AC Motors – 3 Phase Motors – Audio  
Frequency Oscillator (theory), Transformers (theory).

**Unit – III**

Electric Heater (theory) – Induction Heater (theory), Platinum Resistance thermometer –  
Centigrade and Fahrenheit Temperatures and their relation – Simple Problems.

**Unit – IV**

Permanent Magnet Moving Coil (PMMC)- Multimeter as ammeter,voltmeter,ohmmeter-  
Applications of Multimeter-Merits and Demerits of Multimeter

**Unit-V**

Cathode Ray Oscilloscope (CRO) -Cathode Ray Tube (CRT) -Display of Signal Waveform on  
CRO -Signal pattern on screen -Various controls of CRO- Applications of CRO



**Text Book:**

Materials will be given by the department.

**Reference Books :**

1. Brijlal & subramanyam– **A text book of optics S.Chand &co**
2. A.K Sawhney Dhanpat Rai & Co - **A course in electrical and electronic measurements and instrumentation**
3. R. Murugesan, **Electricity & Magnetism**, S.Chand & Co., 9<sup>th</sup> Revised Edition, New Delhi, 2011.



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<b>Class</b>	<b>: B.Sc (Physics)</b>	<b>Part IV</b>	<b>: Skill</b>
<b>Semester</b>	<b>: I</b>	<b>Hours</b>	<b>: 02</b>
<b>Subject Code</b>	<b>: 18UPHS12</b>	<b>Credits</b>	<b>: 02</b>

**BASICS OF C PROGRAMMING**

**Course Outcomes:**

**CO1: Enable the students to understand the fundamentals of programming.**

**CO2: Empower the students to have strong knowledge in the building blocks of C.**

**CO3: Qualify the students with the basic knowledge of C programming.**

**CO4: To develop the skill in writing C-language program.**

**Unit-I:**

Programming fundamentals: Programming fundamentals – Program Development Life Cycle – Algorithm – Control structures – Flow chart – Pseudo code – Programming paradigms.

**Unit-II:**

Data types, variables and constants: Introduction – C standards – Learning programming language and natural language: An analogy – C Character set – identifiers and keywords – declaration statement - Data types – type qualifiers and type modifiers – difference between declaration and definition – data object, L-value and R-value – Variables and constants – Structure of a C program – Executing a C program.

**Unit-III:**

Operators and Expressions: Introduction – Expression – simple and compound expressions – classification of Operators – Combined precedence of all operators – reading strings from the keyboard – printing strings on the screen – unformatted functions.

**Unit-IV:**

Decision making statements: Introduction – statements– classification of statements – branching statements.

**Unit –V:**

Looping statements: Iteration statements. Storage class: Storage duration – life time of an object – storage classes.

**Text Book:**

1. Anita Goel, Ajay Mittal, **Computer Fundamentals and Programming in C**, Pearson, New Delhi, 2014.

Unit – I : Page No 2.25 – 2.35.

Unit – II : Page No 3.1 – 3.18.

Unit – III :Page No 4.1 – 4.32.

Unit – IV : Page No 5.1 – 5.22.

Unit – V :Page No 5.23 – 5.33, 10.1 – 10.9.

**Reference Books:**

1. S.Ramasamy and P.Radhaganesan, **Programming in C (II Edition)**, Scitech Publication (India) Private Limited, Chennai, 2010.
2. Byron Gottfried, **Programming with C (III Edition)**, Tata McGraw Hill, New Delhi, 2012.



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

**Class : B.Sc (Physics) Part IV : Mandatory**  
**Semester : I Hours : 02**  
**Subject Code : 18UEVG11 Credits : 02**

**ENVIRONMENTAL STUDIES**

<b>COURSE OUTCOMES</b>	
<b>CO1:</b> To gain knowledge on the importance of environmental education and ecosystem.	
<b>CO2:</b> To acquire knowledge about environmental pollution- sources, effects and control measures of environmental pollution	
<b>CO3:</b> To understand the various energy sources, exploitation and need of alternate energy resources. Disaster management To acquire knowledge with respect to biodiversity, its threats and its conservation and appreciate the concept of interdependence	
<b>CO4:</b> To make the student to understand the various pollution problems control mechanisms.	
UNIT I	: <b>Environment and Earth:</b> Environment – Meaning – Definition – Components of Environment – Types of Environment. Interference of man with the Environment. Need for Environmental Education. Earth – Formation and Evolution of Earth– Structure of Earth and its components – Atmosphere, Lithosphere, Hydrosphere and Biosphere. <b>Natural Resources:</b> Renewable Resources and Non-Renewable Resources. Natural Resources and Associated Problems. Use and Exploitation of Forest, Water, Mineral, Food, Land and Energy Resources.
UNIT II	: <b>Ecology and Ecosystems:</b> Ecology – Meaning – Definition – Scope – Objectives – Subdivisions of Ecology. <b>Ecosystem</b> –Concept – Structure – Functions – Energy Flow – Food Chain and Food Web – Examples of Ecosystems (Forest, Grassland, Desert, Aquatic).
UNIT III	: <b>Biodiversity:</b> Definition – Biodiversity at Global, National and Local Level. Values of Biodiversity – Threats to Biodiversity – Conservation of Biodiversity. <b>Biodiversity of India:</b> Biogeographical Distribution – Hotspots of Indian Biodiversity – National Biodiversity Conservation Board and Its functions. Endangered and Endemic Species of India
UNIT IV	: <b>Pollution Issues:</b> Definition – Causes – Effects and Control Measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear Pollutions. <b>Global Issues:</b> Global Warming and Ozone Layer Depletion. Future plans of Global Environmental Protection Organisations.
UNIT V	: <b>Sustainable Development:</b> Key aspects of Sustainable Development – Strategies for Sustainable Development – Agriculture – Organic farming – Irrigation – Water Harvesting – Water Recycling – Cyber Waste and Management. <b>Disaster Management:</b> Meaning – Types of Disasters – Flood and Drought – Earth quake and Tsunami – Landslides and Avalanches – Cyclones and Hurricanes – Preventions and Consequences. Management of Disasters -

**Text Book:**

Study Material for **Environmental Studies**, Mannar Thirumalai Naicker College, Pasumalai, Madurai – 625 004.

**Reference Books:**

1. Study Material for **Environmental Studies**, Publications Division, Madurai Kamaraj University, Madurai – 625 021.
2. R.C. Sharma and Gurbir Sangha, **Environmental Studies**, Kalyani Publishers, 1, Mahalakshmi Street, T.Nagar, Chennai – 600 017.
3. Radha, **Environmental Studies for Undergraduate Courses of all Branches of Higher Education, (Based on UGC Syllabus)**, Prasanna Publishers & Distributors, Old No. 20, Krishnappa Street, (Near Santhosh Mahal), Chepak, Chennai – 600 005.
4. S.N.Tripathy and Sunakar Panda, **Fundamentals of Environmental Studies**, Vrinda Publications (P) Ltd. B-5, Ashish Complex, (opp. To Ahicon Public School), MayurVihar, Phase-1, Delhi– 110 091.
5. G.Rajah, **Environmental Studies** for All UG Courses, (Based on UGC Syllabus), Margham Publications, 24, Rameswaram Road, T.Nagar, Chennai – 600 017.



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

**Class : B.Sc (Physics)**  
**Semester : II**  
**Subject Code : 18UPHC21**

**Part III : Core**  
**Hours : 04**  
**Credits : 04**

**ELECTRICITY AND MAGNETISM**

**Course Outcomes:**

**CO1: To enable the students to understand the basic concepts of electricity and magnetism.**

**CO2: To understand the current conduction.**

**CO3: To understand the magnetic field due to electric current.**

**CO4: To improve the skill in the area of current conduction and electromagnetism.**

**Unit I:**

Electric field and flux – Gauss law statement and explanation – Applications of Gauss law – Electric field due to a point charge – Electric field due to charged spherical conductor at a point outside, inside & on the surface of the sphere – Coulomb’s theorem – Electric potential – Relation between electric potential & electric field – Potential due to an electric dipole- Electric potential energy.

**Unit II:**

Capacitance – Principle of capacitor – Effect of a Dielectric in a capacitor – Expression for the capacitance of cylindrical capacitor, parallel plate capacitor (i)With & Without dielectric, (ii)Partially filled with dielectric – Energy stored in a charged capacitor – Loss of energy on sharing of charges between two capacitors – Types of capacitors – Uses of capacitors.

**Unit III:**

Kirchhoff’s laws – Application of Kirchhoff’s laws to Wheatstone’s network – Carey Foster’s Bridge – Determination of the resistance and resistivity of the given wire with the necessary theory – Principle of Potentiometer – Calibration of ammeter and voltmeter (low range only) – Seeback effect – Peltier effect – Thomson effect (explanation alone).

**Unit IV:**

The Magnetic field Intensity (H) – Magnetic Induction (B) – Magnetic flux ( $\phi$ ) – Biot-Savart’s law – It’s applications –Magnetic induction at a point on the axis of a circular coil carrying current – Magnetic induction at a point on the axis of a solenoid – Moving coil ballistic galvanometer – Principle, construction and theory – Difference between Dead beat & Ballistic galvanometer – Current and voltage sensitivities of a moving coil galvanometer.

**Unit V:**

Faraday’s laws of electromagnetic induction – Self inductance of a long solenoid – Mutual inductance between two coaxial solenoids – Coefficient of coupling – Three magnetic vectors – magnetic induction (B), magnetic intensity (H) & magnetization(M) – Dia, Para, Ferro & Ferri

magnetism – Ferrites - Magnetic susceptibility – Guoy’s method – Hysteresis – Explanation & Importance of hysteresis curves.

**Text Book**

- a. R. Murugesan, **Electricity & Magnetism**, S.Chand & Co., 9<sup>th</sup> Revised Edition, New Delhi, 2011.

Unit – I	: 2.1 – 2.3, 2.6, 2.11, 3.1, 3.2, 3.3, 3.5
Unit – II	: 4.1, 4.4, 4.5, 4.6, 4.7, 4.9, 4.11, 4.13
Unit – III	: 6.6, 7.1, 7.2, 8.1, 8.3, 8.4, 8.5, 8.7
Unit – IV	: 10.1, 10.2, 10.4, 10.6, 10.11, 10.12
Unit – V	: 11.1, 11.4, 11.8, 11.10, 15.1 – 15.9, 15.17

**Reference Books:**

1. Narayanamoorthy & Nagarathinam, **Electricity & Magnetism**, National Publishing Co., New Delhi, 1997.
2. Sehgal, Chopra & Sehgal, **Electricity & Magnetism**, Sultan Chand & Sons, New Delhi, 1998.
3. Brijlal & Subramaniam **Electricity & Magnetism**, S.Chand & Co. 20<sup>th</sup> Revised Edition, New Delhi, 2007.



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

**Class : B.Sc (Physics)**  
**Semester : I & II**  
**Subject Code : 18UPHCP1**

**Part III : Core**  
**Hours : 02**  
**Credits : 02**

**MAJOR PHYSICS PRACTICAL-I**

**Course Outcomes:**

- CO1: To create the practical knowledge in basic physics experiments.**  
**CO2: To understand the bending of beam, compound pendulum and torsion pendulum.**  
**CO3: To understand current conduction in electrical circuits.**  
**CO4: To enhance the skill in the physics experiments.**

**LIST OF EXPERIMENTS**

- |   |  |
|---|--|
| 1. Young's Modulus                        | - Uniform bending (Pin & Microscope)           |
| 2. Young's Modulus                        | - Non –Uniform bending – Optic lever           |
| 3. Young's Modulus                        | - Canti lever – Pin and Microscope             |
| 4. Sonometer                              | - laws of transverse vibration                 |
| 5. Surface tension                        | - by capillary rise method                     |
| 6. Rigidity Modulus                       | - Torsion Pendulum with loads                  |
| 7. Spectrometer                           | - Refractive index of a prism                  |
| 8. Moment of Inertia                      | - Torsion Pendulum                             |
| 9. Sonometer                              | - A.C Frequency                                |
| 10. Melde's apparatus                     | - Frequency of tuning fork                     |
| 11. Thermal conductivity of Bad conductor | - Lee's disc                                   |
| 12. C.F Bridge                            | - Resistance and specific Resistance           |
| 13. Potentiometer                         | - Calibration of low range Voltmeter           |
| 14. Potentiometer                         | - Calibration of Ammeter                       |
| 15. Potentiometer                         | - Resistance and resistivity                   |
| 16. Compound Pendulum                     | - Determination of acceleration due to gravity |





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

<b>Class</b>	<b>: B.Sc (Physics)</b>	<b>Part III</b>	<b>: Allied</b>
<b>Semester</b>	<b>: II</b>	<b>Hours</b>	<b>: 06</b>
<b>Sub code</b>	<b>: 18UMTA21</b>	<b>Credits</b>	<b>: 04</b>

**ALLIED MATHEMATICS –II**

**Course Outcomes**

- CO1** To learn and understand about Matrices and straight lines.
- CO2** To introduce the basic concept of sets.
- CO3** To familiarize with interpolation.
- CO4** To provide the capability of solving the physical problems on skill development

- Unit – I** Theory of sets- Introduction- The concept of a set- Set Inclusion- Union of sets- Intersection of sets
- Unit –II** Difference of sets- Complement – Symmetric Difference of Two sets- Cartesian product of sets.
- Unit –III** Curve Fitting – Correlations-Rank Correlations
- Unit –IV** Lagranges and Newton’s Method –Interpolation.
- Unit – V** Matrices – Rank of a Matrix – Consistency of equation- Characteristic Equation and Cayley- Hamilton theorem.

**Text Books:**

1. S.Arumugam and A.T.Isacc , **Modern Algebra**, Scitech Publication, Chennai, Reprint, 2003.
  - Unit I - Chapter 1 : Section 1.0 to 1.4
  - Unit II - Chapter 1 : Section 1.5 to 1.8
  - Unit V - Chapter 7 : Section 7.5 , 7.6, 7.7
2. S.Arumugam and A.T.Isacc, **Satistics**, New Gomma Publications House , Palayamkottai, Reprint 2013.
  - Unit III - Chapter 5 : Section 5.0,5.1
  - Chapter 6 : Section 6.1,6.2
  - Unit IV - Chapter 7 : Section 7.2,7.3

**Reference Books :**

1. Durai Pandian, Laxmi Durai Pandian ,Udayabaskaran, **Algebra and Calculus of Vectors**, S.Viswanthan Printers and Publishers Pvt Ltd, Chennai,1980.
2. A.R.Vasishtha, **Matrices**, Krishna Prakashan and Publication Media Pvt Ltd, 45<sup>th</sup> Edition, Meerut, 2014.
3. S.C.Gupta ,V.K.Kapoor,**Fundamental of Mathematical statistics**, Sultan Chand and Sons Educational Publishers, New Delhi,2009.
4. S.P.Gupta, **Statistical Methods** , Sultan Chand and Sons Educational Publishers, New Delhi,2014.



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

**Class : B.Sc (Physics)**  
**Semester : II**  
**Subject Code : 18UPHS21**

**Part IV : Skill**  
**Hours : 02**  
**Credits : 02**

**BASIC PHOTOGRAPHY**

**Course Outcomes:**

- CO1:** Understand the different source of light.  
**CO2:** Learn to take pictures in a controlled light environment.  
**CO3:** Learn about shooting a variety of products.  
**CO4:** Knowledge in Basic photography gives the job opportunity.

**Unit:I**

Types of cameras for photograph– Compact digital camera – Digital SLR camera– Mirror less camera – Action camera – 360 camera –Film camera

**Unit: II**

Exposure- Setting aperture-Altering the shutter speed understanding ISO – Depth of field – Portrait photography-Nature photography- Night photography.

**Unit: III**

Lenses- Types of lenses –Normal, telephoto, zoom, wide angle, fish eye and close up lenses – Lines,curves,and shapes in photographs- Basics of photography - Perspective, proportion and composition.

**Unit: IV**

Lighting-Light direction resource – External light metering resource –Exposure metering resource – Partial and spot metering resource – Flash.

**Unit: V**

Photo editing-Morphing-Background removing-Useful retouching tools- Cropping-Levels and curves- Contrast control- Hue and saturation- Red eye – Cloning- Printing and saving.

**Text book:**

Materials will be given by the department.

**Reference Books:-**

1. How to use your 35mm camera – Minolta.
2. Michael J. Langford **Basic photography** , Focal Press, London, 4<sup>th</sup> edition.
3. Nirmal Pasricha, **How to become an expert in Photography**,P.A.D.U Publications 1996
4. Harry C.Box, **Set Lighting technician’s handbook**



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

<b>Class</b>	<b>: B.Sc (Physics)</b>	<b>Part IV</b>	<b>: Skill</b>
<b>Semester</b>	<b>: II</b>	<b>Hours</b>	<b>: 02</b>
<b>Subject Code</b>	<b>: 18UPHSP1</b>	<b>Credits</b>	<b>: 02</b>

**PROGRAMMING IN C – Lab**

**Course Outcomes:**

**CO1: Learn the fundamentals of programming concepts.**

**CO2: Develop the students to write simple programs in C.**

**CO3: Practice the students using control statements.**

**CO4: To practice the C- Language skill in the lab.**

Simple C programming in Data types, Expression Evaluation and Conditional Statements:

1. Write a C program to find area and circumference of various shapes like square, rectangle, triangle, circle and sphere etc.
2. Write a C program to convert decimal value into octal value.
3. Write a C program to find the exponent of the given number.
4. Write a C program for swapping two variables without using temp and with using temp variable.
5. Write a C program to convert Fahrenheit into Celsius Values.
6. Write a C program to print the size of data types.
7. Write a C program to print multiplication table.
8. Write a C program to find factorial value of the given number.
9. Write a C program whether the given number is odd or even.
10. Write a C program whether the given number is positive or negative
11. Write a C program to find the given number is prime or not.
12. Write a C program to find the given number is Armstrong or not
13. Write a C program to find the given number is perfect or not
14. Write a C program to find the sum of digits of the given value.
15. Write a C program to find the largest and smallest of three numbers.
16. Write a C program to find whether a year is leap or not.
17. Write a C program to print Pascal triangle.
18. Write a simple menu driven Calculator program using switch statement.
19. Write a C program for Electricity Bill preparation.
20. Write a C program to print student mark sheet.



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

**Class : B.Sc (Physics) Part IV : Mandatory**  
**Semester : II Hours : 02**  
**Subject Code :18UVLG21 Credits : 02**

**VALUE EDUCATION**

<b>COURSE OUTCOMES</b>	
<p><b>CO1:</b>Clarifying the meaning and concept of value – value education.</p> <p><b>CO2:</b>To inspire <b>students</b> to develop their personality and social <b>values</b> based on the principles of human <b>values</b>.</p> <p><b>CO3:</b>Developing sense of Love, Peace and Brotherhood at Local, national and international levels.</p> <p><b>CO4:</b>To enable the students to understand the social realities and to inculcate an essential value system towards building a health society</p>	
UNIT I	<p><b>: Values and The Individual:</b> Values – Meaning – Definition – Importance – Classification of Values, Value Education – Meaning – Need for Value Education. Values and the Individual – Self-Discipline – Meaning – Tips to Improve Self-Discipline. Self-Confidence – Meaning – Tips to Improve Self-Confidence. Empathy – Meaning – Role of Empathy in motivating Values. Compassion – Role of Compassion in motivating Values. Forgiveness – Meaning – Role of Forgiveness in motivating Values. Honesty – Meaning – Role of Honesty in motivating Values. Courage – Meaning – Role of Courage in motivating Values.</p>
UNIT II	<p><b>: Religions and Communal Harmony:</b> Religions – Meaning – Major Religions in India – Hinduism – Values in Hinduism. Christianity – Values in Christianity. Islam – Values in Islam. Buddhism – Values in Buddhism. Jainism – Values in Jainism. Sikhism – Values in Sikhism. Need for Religious Harmony in India. Caste System in India – Need for Communal Harmony in India. Social Justice – Meaning – Factors Responsible for Social Justice.</p>
UNIT III	<p><b>: Society and Social Issues:</b> Society – Meaning – Values in Indian Society. Democracy – Meaning – Values in Indian Democracy. Secularism – Meaning – Values in Indian Secularism. Socialism – meaning – Values in Socialism. Social Issues – Alcoholism – Drugs – Poverty – Unemployment.</p>

UNIT IV	:	<b>Human Rights and Marginalised People:</b> Human Rights – Meaning – Problem of Violation of Human Rights in India – Authorities available under the Protection of Human Rights Act in India. Marginalised People like Women, Children, Dalits, Minorities, Physically Challenged – Concept – Rights – Challenges. Transgender – Meaning – Issues.
UNIT V	:	<b>Social Institutions in Value Formation:</b> Social Institutions – Meaning – Important Social Institutions. Family – Meaning – Role of Families in Value Formation. Role of Press & Mass Media in Value Formation – Role of Social Activists – Meaning Contribution to Society – Challenges.

**Text Book:**

1. Text Module for **Value Education**, Mannar Thirumalai Naicker College, Pasumalai, Madurai – 625 004

**Reference Books:**

1. Text Module for **Value Education**, Publications Division, Madurai Kamaraj University, Madurai – 625 021.
2. N.S.Raghunathan, **Value Education**, Margham Publications, 24, Rameswaram Road, T.Ngar, Chennai – 600 017.
3. Dr.P.Saravanan, and P.Andichamy, **Value Education**, Merit India Publications, (Educational Publishers), 5, Pudumandapam, Madurai-625001.