

Skill Based Elective



THANTHAI HANS ROEVER COLLEGE (AUTONOMOUS)

ELAMBALUR, PERAMBALUR – 621 220

PG & RESEARCH DEPARTMENT OF PHYSICS



VISION

To blossom as an institution of excellence, enabling, empowering and enlightening the youth and shaping them as fully developed human beings with the capacity to unfold their full mental potentiality resulting in the attainment of the wisdom to live constructively and meaningfully.

MISSION

- To provide congenial and stress- free environment and opportunities for the enhancement of knowledge and acquisition skills through the best exposure and training possible.
- To offer multifaceted and need-based academic programmes and to promote extension activities.
- To adopt technology-enabled new methods, approaches and techniques so that the teaching-learning process becomes learner-centred and learner-friendly.
- To maximize the participation of all the stakeholders in the development of the institution and the region.
- To sensitize the youth towards inclusive growth for socio-economic change, sustainable development, gender equality, eco-friendliness, etc.
- To enable the youth to experience the effects of globalization and facilitate them to grow as responsible citizens and leaders.
- To inspire them, through value-based education, to embrace the entire humanity while firmly rooted in the Indian ethos.
- To provide regular placement training and placement opportunities.
- To kindle the spirit of creativity and enhance research activities and enable them to attain international standards.

PROGRAMME OUTCOMES

Upon completion of the programme, the Undergraduate will be able to

1. Gain advanced knowledge resulting in entrepreneurship; innovation and newer opportunities for being employable in public and private sectors, research and development organizations.
2. Apply enhanced new techniques and adopt new technologies needed in the respective disciplines.
3. Appreciate the diversity of behavior in professional practice and act in accordance with the core values of chosen profession.
4. Demonstrate the knowledge, values and skills to be critical consumer of research practice and possess investigative skills to evaluate the practice.
5. Engage in lifelong learning process, have the ability to communicate the findings of Languages / Commerce / Management studies / Social Work / Computing Sciences / Physical Sciences / Biological Sciences / Life Sciences with the current knowledge.

PROGRAMME SPECIFIC OUTCOMES

1. Conceptual Knowledge and Awareness on the impact of Physics.
2. Observational acquired experimental skills measuring and computational techniques.
3. Problem analyzing and solving skill; understanding and logical thinking, reasoning and troubleshooting.
4. Acquire analytical and logical skill for higher education
5. Research orientated internship and employability enhancement.

OFFICE AUTOMATION

Skill Based Elective: I
Course Code: 20UPH4SBE1
Hours / Week: 2
Credit: 2

Semester: IV
Maximum Marks : 100
Internal Marks : 25
External Marks : 75

COURSE OUTCOMES

On completion of the course, the student will be able to

- Understand the basic knowledge of Ms. Word
- Develop the skill in Ms. Word
- Understand the basic knowledge of Ms. Excel
- How to create and designing the PowerPoint
- Know the basic skill of Photoshop
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UNIT I: MS-WORD - I

1. Text Manipulation: Write a paragraph about your institution and Change the font size and type, Spell check, Aligning and justification of Text
2. Bio data: Prepare a Bio-data.
3. Find and Replace: Write a paragraph about yourself and do the following. Find and Replace - Use Numbering Bullets, Footer and Headers.

UNIT II: MS-WORD - II

1. Tables and manipulation: Creation, Insertion, Deletion (Columns and Rows). Create a mark sheet.
2. Mail Merge: Prepare an invitation to invite your friends to your birthday party. Prepare at least five letters.

UNIT III: MS-EXCEL

1. Data sorting-Ascending and Descending (both numbers and alphabets)
2. Mark list preparation for a student
3. Individual Pay Bill reparation.
4. Invoice Report reparation.
5. Drawing Graphs. Take your own table.

UNIT IV: MS-POWERPOINT

1. Create a slide show presentation for a seminar.
2. Preparation of Organization Charts
3. Create a slide show presentation to display percentage of marks in each semester for all students

1. Use bar chart (X-axis: Semester, Y-axis: %marks).
2. Use different presentation template different transition effect for each slide.

UNIT V: PHOTOSHOP

Introduction to Photoshop – The File menu - The tools - Drawing lines & shapes - Inserting Picture and shapes - filling colors - Text effects, working with layers, filters.

E-REFERENCES

1. <https://ptgmedia.pearsoncmg.com/images/9780735623026/samplepages/9780735623026.pdf>
2. https://www.dit.ie/media/ittraining/msoffice/MOAC_Excel_2016_Core.pdf
3. <https://ptgmedia.pearsoncmg.com/images/9780735697799/samplepages/9780735697799.pdf>

Relationship Matrix for course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20UPH4SBE1	OFFICE AUTOMATION					2	2			
Course Outcomes (Cos)	Programme Outcomes					Programme Specific Outcomes					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓		✓	✓	✓	✓	✓	✓	
CO2	✓		✓			✓					
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO4	✓	✓	✓	✓	✓	✓	✓	✓			
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of Matches() = 40, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared By

Checked By

HOD

NUMERICAL METHODS

Skill Based Elective: II
Course Code: 20UPH5SBE2
Hours / Week: 2
Credit: 2

Semester: IV
Maximum Marks : 100
Internal Marks : 25
External Marks : 75

COURSE OUTCOMES

On completion of the course,

- Develop the mathematical skills in the area of errors.
- Understand the numerical techniques to solve the linear equations.
- Understand various methods used to solve the physical problems.
- Explains Numerical Solution of ordinary differential equation
- Describes the concept of Numerical Integration

UNIT I: ERRORS

Errors of arithmetic and computation: Inherent errors, numerical errors, modeling errors, Blunders, Absolute and relative errors, Machine Epsilon - Error propagation - Conditioning and stability - Error estimation.

UNIT II: MATRIX AND LINEAR EQUATIONS

Introduction- system of linear equations- Gauss Elimination method-Gauss Seidal Iteration method-Gauss Jordan elimination method.

UNIT III: CURVE FITTING

Principle of least square – fitting a straight line – linear regression –fitting a parabola - fitting an exponential curve

UNIT IV: ITERATIVE METHODS

Solving non – linear equation – bisection method – Successive approximation – Newton Raphson method – modified Euler's method –Runge – Kutta method (second and third orders only)

UNIT V: NUMERICAL INTEGRATION

General formula – Trapezoidal rule – Simpson's - 1/3 rd rule and 3/8th rule – Gaussian quadrature formula

BOOKS FOR STUDY AND REFERENCE:

1. Introductory methods of numerical analysis – S.S. Sastry, Prentice Hall of India, New Delhi (2000)
2. Numerical methods – A. Singaravelu, Meenakshi Agency, Chennai (2001).
3. Numerical method in Science and Engineering – M.K. Venkataraman, PHI –New Delhi (1997)
4. Mechanics and Mathematical methods, R. Murugesan, S. Chand & Co, NewDelhi (1999)
5. Numerical methods by P. Kandasamy, K. Thilagavathy and K. Gunavathy, S. Chand & Co. (2002).

Relationship Matrix for course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20UPH5SBE2	NUMERICAL METHODS					2	2			
Course Outcomes (Cos)	Programme Outcomes					Programme Specific Outcomes					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓		✓	✓	✓	✓	✓		
CO2	✓		✓			✓					
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of Matches() = 38, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

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HOD

EVERYDAY PHYSICS

Skill Based Elective: III
Course Code: 20UPH5SBE3
Hours / Week: 2
Credit: 2

Semester: IV
Maximum Marks : 100
Internal Marks : 25
External Marks : 75

COURSE OUTCOMES

On completion of the course, the student will be able to

- Understand the knowledge of the home electrical appliances in everyday life,
- Develop the skill in electronic equipments
- Understand the trouble shoot electrical circuits.
- Needs a basic knowledge in electricity and the learners are expected to gain more knowledge for AC and DC
- Understand the operations and safety handling of certain commonly used domestic appliances

UNIT I

Physics behind Home appliances – Light bulb – Fan – Hair drier – Television – Air Conditioners – microwave ovens – Vacuum cleaners – Dishwasher – Washing machines

UNIT II

How things work – Basic principles – Rape recorder – Taps – Lifts – Submarines – Jet planes – Helicopters – Rockets – fax machines – Pagers – Cellular phones

UNIT III

Demonstration – making a switch board with multiple points – wiring – one lamp controlled by one switch/Two switches – fixing a fuse – soldering – P.C.B Preparation

UNIT IV

Study of resistors, chokes, Capacitors and Transformers – multimeter – Basic principles – measurement of resistance, Voltage AC & DC

UNIT V

Servicing of domestic appliances – iron box – mixer – grinder – motor – emergency lamp

Books for Study

1. The Learner's series – Everyday science – Published by INFINITY BOOKS, New Delhi
2. The Hindu speaks on Science, Vol I & II, Kasturi Ranga Publishers, Chennai

Books for Reference

1. Fundamentals of Physics by D. Halliday, R.Rensick and J. Walker, 6th edition, Wiley, New York (2001).
2. Physics, Vols I, II, III by D.Halliday, R.Resnick and K.S.Krane, 4th Edition, Wiley, New York (1994).

3. The Feymann Lectures on Physics Vols I, II, III by R.P. Feynmann, R.B. Leighton & M. Sands, Narosa, New Delhi (1998).

Relationship Matrix for course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
III	20UPH5SBE3	EVERYDAY PHYSICS					2	2			
Course Outcomes (Cos)	Programme Outcomes					Programme Specific Outcomes					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓		✓	✓	✓	✓	✓	✓	
CO2	✓		✓			✓					
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of Matches() = 42, Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

Prepared By

Checked By

HOD

NME IN PHYSICS



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- To enable the youth to experience the effects of globalization and facilitate them to grow as responsible citizens and leaders.
- To inspire them, through value-based education, to embrace the entire humanity while firmly rooted in the Indian ethos.
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PROGRAMME OUTCOMES

Upon completion of the programme, the Undergraduate will be able to

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7. Apply enhanced new techniques and adopt new technologies needed in the respective disciplines.
8. Appreciate the diversity of behavior in professional practice and act in accordance with the core values of chosen profession.
9. Demonstrate the knowledge, values and skills to be critical consumer of research practice and possess investigative skills to evaluate the practice.
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PROGRAMME SPECIFIC OUTCOMES

6. Conceptual Knowledge and Awareness on the impact of Physics.
7. Observational acquired experimental skills measuring and computational techniques.
8. Problem analyzing and solving skill; understanding and logical thinking, reasoning and troubleshooting.
9. Acquire analytical and logical skill for higher education
10. Research orientated internship and employability enhancement.

MAINTENANCE OF ELECTRICAL APPLIANCES

Non Major Elective: I

Course Code: 20UPH3NME1

Hours / Week: 2

Credit: 2

Semester: III

Maximum Marks: 100

Internal Marks : 25

External Marks : 75

LEARNING OUTCOME

On completion of the course, the student will be able to

- ✓ Understand the electric fundamental laws.
- ✓ Analyze the characteristics of transformer and its applications.
- Understand the operations and safety handling of certain commonly used domestic appliances.
- Needs a basic knowledge in electricity and the learners are expected to gain more knowledge for AC and DC
- Understand the trouble shoot electrical circuits.

UNIT-I:

Resistance - capacitance - inductance and its units - electrical charge - current - potential - units and measuring meters - Ohm's law - Galvanometer, ammeter, voltmeter and multimeter.

Electrical energy - power - watt - kWh - consumption of electrical power.

UNIT-II:

Transformer - principle and working - classification of transformers - testing of transformers - Core, Shell and Berry types, auto transformer - construction and uses. Cooling of transformers - Losses in transformer.

Unit-III:

Electric bulbs – Fluorescent lamps - Street Lighting - Electric Fans - Wet Grinder - Mixer - Water Heater - Storage and Instant types-electric iron box- microwave oven - Washing Machine - Stabilizer, Fridge and Air conditioner.

UNIT-IV:

AC and DC- Single phase and three phase connections - RMS and peak values-house wiring - Star and delta connection - overloading - earthing - short circuiting - colour code for insulation wires.

UNIT-V:

Electrical protection - Relays - Fuses - Electrical switches - Circuit breakers- ELCB - overload devices - ground fault protection - Inverter - UPS - generator and motor.

BOOKS FOR STUDY AND REFERENCE

1. A text book in Electrical Technology - B L Theraja - S Chand & Co.
2. A text book of Electrical Technology - A K Theraja
3. Performance and design of AC machines - M G Say ELBS Edn.
4. Semi conductor physics and opto electronics by P K Palanichamy
5. Basic Electronics - B L Theraja - S Chand & Co.
6. Principles of Communication Engineering - Arokh Singh and A K Chhabra - S Chand & Co.

Relationship Matrix for course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits				
III	20UPH3NME1	MAINTANANCE OF ELECTRICAL APPLIANCES					2	2				
Course Outcomes (Cos)	Programme Outcomes					Programme Specific Outcomes						
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5		
CO1	✓	✓	✓		✓	✓	✓	✓	✓	✓		
CO2	✓		✓			✓						
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
Number of Matches() = 42, Relationship: High												

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High

FUNDAMENTALS OF PHYSICS –I

Non Major Elective: II
Course Code: 20UPH4NME2
Hours / Week: 2
Credit: 2

Semester: IV
Maximum Marks: 100
Internal Marks : 25
External Marks : 75

LEARNING OUTCOME

On completion of the course, the student will be able to

- ✓ Introduce some basic concept of Physics like measurement of physical quantities,
- ✓ Analyze the states of matter and its applications
- ✓ Understand the energies and energy sources to students studying other than Physics.
- ✓ Understand the different energy sources
- ✓ The study of phenomena interference, diffraction, and polarization laws

UNIT 1:

S.I. Units – measurements of length, mass, time and other physical quantities – Dimensional formula for area, volume, density and force – Uses of dimension.

UNIT II:

Matter – Solid, Liquid, Gas and Plasma – Application of Plasma – change of state – specific heat capacity – specific latent heat of ice and steam.

UNIT III:

Kinds of energy – Mechanical energy, Thermal energy, Optical energy, Sound energy, Electrical energy, Atomic and Nuclear energy, (Examples) – Conservation of energy.

UNIT IV:

Renewable and non – renewable energy – Fossil fuel – coal Oil – Solar – Wind – Biomass – OTEC.

UNIT V:

Mirror – Laws of reflection – Image formation (Concave and Convex mirror) Lens – Law's of refraction – Image formation (Concave and Convex lens) – Defects of eye and rectification.

Book for Study

1. First Year B. Sc Physics – B.V. Narayan Rao, New Age International (P) Lt, 1998.

Reference Books :

1. Mechanics – D.S. Mathur – S.Chand& Co., 2002.
2. Properties of matter – D.S. Mathur – S. Chand & Co., 2002.
3. Properties of matter – Brijlal Subramanian – S. Chand & Co., 2006.

Relationship Matrix for course Outcomes, Programme Outcomes and Programme Specific Outcomes:

Semester	Code	Title of the Course					Hours	Credits			
I	20UPH4NME2	FUNDAMENTALS OF PHYSICS –I					2	2			
Course Outcomes (Cos)	Programme Outcomes					Programme Specific Outcomes					
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO2	✓		✓			✓				✓	
CO3	✓	✓		✓	✓	✓	✓	✓	✓	✓	
CO4	✓	✓		✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Number of Matches() = 41 , Relationship: High											

Mapping	1-29%	30-59%	60-69%	70-89%	90-100%
Matches	1-14	15-29	30-34	35-44	45-50
Relationship	Very Poor	Poor	Moderate	High	Very High