



**THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS),
Sivakasi**

(Affiliated to Madurai Kamaraj University, Reaccredited with "A" Grade by NAAC,
College with Potential for Excellence by UGC & Mentor Institution under UGC PARAMARSH)

NAAC SSR Cycle IV (2015-2020)

1.2. ACADEMIC FLEXIBILITY

1.2.1. NEW COURSES

**NEW COURSES INTRODUCED
B.Sc. PHYSICS - 2017 AND LATER**



**THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS),
SIVAKASI – 626 123.**

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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED


B.Sc. PHYSICS


2017 AND LATER

THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS),
SIVAKASI.
DEPARTMENT OF PHYSICS
B. Sc Physics – Programme code: GLPH
(For those who have joined in June 2017 and later)

New Course Details

Course code	Course Title
GLPH4DSL	Lab- Scientific Skill Development


Dr. (Mrs) S. SIVA DEVI
HOD of Physics
The S.F.R. College for Women
SIVAKASI - 626 123.


Dr. T. Palaniveswari
PRINCIPAL
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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED

B.Sc. PHYSICS

2017 AND LATER

THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
B.Sc. PHYSICS PROGRAMME
(For those who have joined in 2017 and later)
CHOICE BASED CREDIT SYSTEM
PROGRAMME CODE – GLPH
PROGRAMME SCHEME

Component	Course Code	Course Title	Teaching Hours Per Week	Credits	Duration of Exam. (Hrs.)	Marks Allotted		
						Internal	External	Total
Semester I								
Part I	GLGT11/ GLGH11/ GLGF11	சங்க இலக்கியமும் உரைநடையும்/ Hindi Language Course – I/ French Language Course - I	6	3	3	25	75	100
Part II	GLGE11	Communicative English-I	6	3	3	25	75	100
Part III	GLPH11	Mechanics and Properties of Matter	4	4	3	25	75	100
	GLPH12	Physics applications in Everyday life	3	3	3	25	75	100
	GLPH1A	Fundamental Physics (Maths & Chemistry)	4	4	3	25	75	100
Part IV	GLPE11	Peace Education	2	2	2	25	75	100
Total			25	19				600
Semester II								
Part I	GLGT21/ GLGH21/ GLGF21	காப்பிய இலக்கியமும் புதினமும்/ Hindi Language Course - II / French Language Course - II	6	3	3	25	75	100
Part II	GLGE21	Communicative English-II	6	3	3	25	75	100
Part III	GLPH21	Optics	5	5	3	25	75	100
	GLPH2L	Lab 1	6	4	3	40	60	100
	GLPH2A1	Digital Electronics (Maths)	4	4	3	25	75	100
	GLPH2A2	Solid State Physics and Digital Electronics (Chemistry)	4	4	3	25	75	100
Part IV	GLS21	Value Added Course Environmental studies	2	2	2	25	75	100
	GLCL23	Value Added Course Introduction to Computers and MS office	2	2	2	25	75	100
Part V	-	Extension Activities – Physical Education and Social Awareness Programme		1				100
Total			35	28				900
Semester III								
Part I	GLGT31/ GLGH31/ GLGF31	சமய இலக்கியமும் நாடகமும்/ Hindi Language Course –III / French Language Course - III	6	3	3	25	75	100
Part II	GLGE31	Communicative English-III	6	3	3	25	75	100
Part III	GLPH31	Electricity	4	4	3	25	75	100
	GLPH32	Electromagnetism	3	3	3	25	75	100
Part IV	GLPH3N	Physics for the new world	2	2	2	25	75	100
Total			32	21				700
Semester IV								
Part I	GLGT41/ GLGH41/ GLGF41	சலிதை இலக்கியமும் சிறுகதையும்/ Hindi Language Course -IV/ French Language Course - IV	6	3	3	25	75	100
Part II	GLGE41	Communicative English-IV	6	3	3	25	75	100


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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED

B.Sc. PHYSICS

2017 AND LATER

Part III	GLPH41	Basic Electronics	5	5	3	25	75	100
	GLPH4L	Lab II	6	4	3	40	60	100
	GLPH4N	Solar Energy and Its Applications	2	2	2	25	75	100
Part IV	GLPH4DSL	Skill Based Course Discipline Specific Course Scientific Skill Development	2	2	2	40	60	100
	Total		27	19				600
Semester V								
Part III	GLPH51	Classical Mechanics	6	5	3	25	75	100
	GLPH5E1	Digital Electronics	5	5	3	25	75	100
	GLPH5E2	Atomic and Nuclear Physics	5	5	3	25	75	100
	GLPH5E3	Fiber optics	5	5	3	25	75	100
	GLPH5E4	Energy physics	5	5	3	25	75	100
Part IV	GLGV51	Value Added Course Career Guidance and Subject Viva	2	2	2	25	75	100
	GLWS51	Value Added Course Women Studies	2	2	2	25	75	100
	Total		30	29				700
Semester VI								
Part III	GLPH61	Solid State Physics	6	5	3	25	75	100
	GLPH62	Wave mechanics	5	5	3	25	75	100
	GLPH6L	Lab IV	6	5	3	40	60	100
	GLPH6E1	Thermodynamics	5	5	3	25	75	100
	GLPH6E2	Bio physics	5	5	3	25	75	100
Part IV	GLSE66	Skill Based Courses (Open to all) Self-Employment courses Domestic Electrical Appliances Servicing	2	2	2	25	75	100
	GLSE66L	Self-Employment courses Domestic Electrical Appliances Servicing – Lab	2	2	3	40	60	100
Total		31	29				700	

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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED

B.Sc. PHYSICS

2017 AND LATER

THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS

COURSES OFFERED FOR OTHER MAJOR STUDENTS

Component	Course Code	Course Title	Teaching Hours Per Week	Credits	Duration of Exam. (Hrs.)	Marks Allotted		
						Internal	External	Total
Semester I								
Part III	GLPH1A	Allied Course for I B. Sc Mathematics and Chemistry Major Students Fundamental Physics (Maths & Chemistry)	4	4	3	25	75	100
Semester II								
Part III	GLPH2A1	Allied Course for I B. Sc Mathematics Major Students Digital Electronics (Maths)	4	4	3	25	75	100
	GLPH2A2	Allied Courses for I B. Sc Chemistry Major Students Solid State Physics and Digital Electronics (Chemistry)	4	4	3	25	75	100
	GLPH2AL	Allied Lab (Maths & Chemistry)	2+2	2	3	40	60	100
Semester III								
Part IV	GLPH3N	Non Major Elective Course Physics for the new world	2	2	2	25	75	100
Semester IV								
Part IV	GLPH4N	Non Major Elective Course Solar Energy and its Applications	2	2	2	25	75	100
Semester VI								
Part IV	GLSE66	Skill Based Courses (Open to all) Self-Employment Courses / JOC Domestic Electrical Appliances Servicing	2	2	2	25	75	100
	GLSE66L	Domestic Electrical Appliances Servicing - Lab	2	2	3	40	60	100

Extra Credit Course (Open to All)

Semester	Course Code	Course Title	Total Contact Hours	Credits	Duration of Exam (Hours)	Marks Allotted		
						Internal	External	Total
Odd/ Even	GLPHEC1	Nanotechnology	2	2	3	25	75	100
Odd/ Even	GLPHEC2	Physics for Competitive examinations	2	2	3	25	75	100

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DEPARTMENT OF PHYSICS


NEW COURSES INTRODUCED

B.Sc. PHYSICS

2017 AND LATER

THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN, SIVAKASI.
DEPARTMENT OF PHYSICS
CERTIFICATE PROGRAMME IN DIGITAL PHOTOGRAPHY AND PHOTOSHOP
(For those admitted in June 2017 and later)

Course code	Course title	Teaching Hours	Credits	Duration of Exams (Hrs.)	Marks Allotted		
					Internal	External	Total
ACDP11	Digital Photography and Photoshop	30	5	3	25	75	100
ACDP1L	Digital Photography and Photoshop - Lab	30	5	3	40	60	100


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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED

B.Sc. PHYSICS

2017 AND LATER

**THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN,
SIVAKASI
DEPARTMENT OF PHYSICS
B.Sc. PHYSICS
SEMESTER IV**

**DISCIPLINE SPECIFIC COURSE
GLPH4DSL – LAB - SCIENTIFIC SKILL DEVELOPMENT**

(Any 10 Experiments)

(For those admitted in June 2017 and later)

Contact Hours per week : 2
Total number of Hours per semester : 30
No. of Credits : 2

Course Outcomes (CO):

On successful completion of the course, the learners should be able to

- CO1: report life history of scientists and their inventions
- CO2: analyze a scientific journal
- CO3: solve problems in Physics
- CO4: troubleshoot the electrical and electronic circuits
- CO5: acquire the presentation skills in conferences

CO-PO Mapping table (Course Articulation Matrix)

POs \ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	0	0	9	0	0	1
CO2	1	3	3	9	0	0	1
CO3	3	9	9	0	0	0	1
CO4	9	9	9	0	0	0	1
CO5	9	9	9	9	0	0	1
Weightage of the course	23	30	30	27	0	0	5
Weighted percentage of Course contribution to POs	2.88	3.66	6.62	6.85	0	0	3.09

Approved in the Academic Council meeting held on 13.6.2019

UGPHY- 60



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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED

B.Sc. PHYSICS

2017 AND LATER

List of experiments

1. Interview with Scientist
2. Role play
3. Famous quotes of scientist
4. Presentation on science topics
5. Review of a scientific article
6. Solving the problems (like National Graduate Physics Examinations (NGPE) and other competitive exams question paper)
7. Trouble shooting problems – Digital Electronics
8. Solving the problems for competitive exams
9. Latest inventions using chart or model
10. Dynamic model display
11. Demo of the experiment



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NAAC SSR Cycle IV (2015-2020)

1.2. ACADEMIC FLEXIBILITY

1.2.1. NEW COURSES

**NEW COURSES INTRODUCED
B.Sc. PHYSICS - 2014 AND LATER**



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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED


B.Sc. PHYSICS

2014 AND LATER

THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS),
SIVAKASI.
DEPARTMENT OF PHYSICS
B. Sc Physics – Programme code: 14UPH
(For those who have joined in June 2014 and later)

New Course Details

Course code	Course Title
14UPH31	Electricity
14UPH32	Electromagnetism
14UPH62	Wave Mechanics
14UPHC2	Physics for Competitive Examinations


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DEPARTMENT OF PHYSICS


NEW COURSES INTRODUCED

B.Sc. PHYSICS


2014 AND LATER

THE STANDARD FIREWORKS RAJARATNAM COLLEGE FOR WOMEN (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
B.Sc. PHYSICS PROGRAMME
(For those who have joined in 2014 and later)
CHOICE BASED CREDIT SYSTEM
PROGRAMME CODE – 14UPH
PROGRAMME SCHEME

Component	Course Code	Course Title	Teaching Hours Per Week	Credits	Duration of Exam. (Hrs.)	Marks Allotted		
						Internal	External	Total
Semester I								
Part I	14UGT11/ 14UGH11/ 14UGF11	தற்கால இலக்கியம்/ Hindi Language Course – I/ French Language Course - I	6	3	3	25	75	100
Part II	14UGE11	Communicative English-I	6	3	3	25	75	100
Part III	14UPH11	Basic Physics	4	4	3	25	75	100
	14UPH12	Physics in Everyday life	3	3	3	25	75	100
	14UPH1A	Fundamental Physics (Maths & Chemistry)	4	4	3	25	75	100
Part IV	14UPE11	Peace Education	2	2	2	25	75	100
Total			25	19				500
Semester II								
Part I	14UGT21/ 14UGH21/ 14UGF21	பக்தி இலக்கியம்/ Hindi Language Course -II / French Language Course - II	6	3	3	25	75	100
Part II	14UGE21	Communicative English-II	6	3	3	25	75	100
Part III	14UPH21	Optics	5	5	3	25	75	100
	14UPH2L	Practical I	6	4	3	40	60	100
	14UPH2A1	Digital Electronics	4	4	3	25	75	100
	14UPH2A2	Solid State Physics (Chemistry)	4	4	3	25	75	100
	14UPH2AL	Allied Practical (Maths & Chemistry)	2+2	2	3	40	60	100
Part IV	14UES21	Value Added Course Environmental studies	2	2	2	25	75	100
	14UCL23	Value Added Course Introduction to Computers and MS office	2	2	2	25	75	100
Part V	-	Extension Activities – Physical Education and Social Awareness Programme		1				100
Total			35	26				900
Semester III								
Part I	14UGT31/ 14UGH31/ 14UGF31	காப்பிய இலக்கியம்/ Hindi Language Course –III / French Language Course - III	6	3	3	25	75	100
Part II	14UGE31	Communicative English-III	6	3	3	25	75	100
Part III	14UPH31	Electricity	4	4	3	25	75	100
	14UPH32	Electromagnetism	3	3	3	25	75	100
Part IV	14UPH3N	Non Major Elective I Physics for the New World	2	2	2	25	75	100
Total			21	15				500
Semester IV								
Part I	14UGT41/	சங்க இலக்கியம்/Hindi Language	6	3	3	25	75	100


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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED

B.Sc. PHYSICS

2014 AND LATER

	14UGH41/ 14UGF41	Course -IV/ French Language Course - IV						
Part II	14UGE41	Communicative English-IV	6	3	3	25	75	100
Part III	14UPH41	Basic Electronics	5	5	3	25	75	100
	14UPH4L	Practical II	6	4	3	40	60	100
Part IV	14UPH5N	Non Major Elective II Solar Energy and its Applications	2	2	2	25	75	100
	14USK41	Soft Skill Enhancement	2	2	-	40	60	100
Total			27	19				600
Semester V								
Part III	14UPH51	Classical Mechanics	6	5	3	25	75	100
	14UPH5L	Practical III	6	5	3	40	60	100
	14UPH5E1	Digital Electronics	5	5	3	25	75	100
	14UPH5E2	Atomic and Nuclear Physics	5	5	3	25	75	100
	14UPH5E3	Fiber Optics	5	5	3	25	75	100
Part IV	14UGV51/ 15UGV51	Value Added Course Career Guidance and Subject Viva	2	2	2	25	75	100
	14UWS51	Value Added Course Women Studies	2	2	2	25	75	100
	Total			36	34			
Semester VI								
Part III	14UPH61	Solid State Physics	6	5	3	25	75	100
	14UPH62	Wave Mechanics	5	5	3	25	75	100
	14UPH6L	Practical IV	6	5	3	40	60	100
	14UPH6P	Project	6	3	-	-	100	100
	14UPH6E1	Thermodynamics	5	5	3	25	75	100
	14UPH6E2	Bio Physics	5	5	3	25	75	100
Part IV	14USE66	Skill Based Courses (Open to all) Self-Employment/ Job Oriented courses – Theory	2	2	2	25	75	100
	14USE66L	Self-Employment/ Job Oriented courses – Practical	2	2	3	40	60	100
Total			37	32				800

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DEPARTMENT OF PHYSICS
COURSES OFFERED FOR OTHER MAJOR STUDENTS**

Component	Course Code	Course Title	Teaching Hours Per Week	Credits	Duration of Exam. (Hrs.)	Marks Allotted		
						Internal	External	Total
Semester I								
Part III	14UPH1A	Allied Courses for I B. Sc Mathematics and Chemistry Major Students Fundamental Physics (Maths & Chemistry)	4	4	3	25	75	100
Semester II								
Part III	14UPH2A1	Allied Courses for I B. Sc Mathematics Major Students Digital Electronics (Maths)	4	4	3	25	75	100

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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED

B.Sc. PHYSICS

2014 AND LATER

	14UPH2A2	Digital Electronics & Solid State Physics(Chemistry)	4	4	3	25	75	100
	14UPH2A L	Allied Practical (Maths& Chemistry)	2+2	2	3	40	60	100
Semester III								
Part IV	14UPH3N	Non Major Elective Course NME I – Physics for the New World	2	2	2	25	75	100
Semester V								
Part IV	14UPH5N	Non Major Elective Course NME II - Solar Energy and its Applications	2	2	2	25	75	100
Semester VI								
Part IV	14USE66	Skill Based Courses (Open to all) Self-Employment Courses / JOC Domestic Electrical Appliances Servicing	2	2	2	25	75	100
	14USE66L	Practical – Domestic Electrical Appliances Servicing	2	2	3	40	60	100


Extra Credit Course (Open to All)

Semester	Course Code	Course Title	Total Contact Hours	Credits	Duration of Exam (Hours)	Marks Allotted		
						Internal	External	Total
Odd/ Even	14UPHEC	Nanotechnology	30 hours per semester	2	3	25	75	100


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DEPARTMENT OF PHYSICS
(For those admitted in June 2014 and later)

Certificate Programme in Digital Photography and Photoshop

Sem.	Course Code	Course Title		Teaching Hrs	Credit	Exam. Hrs	Marks		
							Internal	External	Total
	14XCDP1	Digital Photography and Photoshop	Theory	45	5	3	25	75	100
	14XCDPL	Digital Photography and Photoshop-Lab	Practical	45	4	3	40	60	100


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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED

B.Sc. PHYSICS

2014 AND LATER

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SIVAKASI
DEPARTMENT OF PHYSICS
B.Sc. PHYSICS
SEMESTER III
MAJOR COURSE
14UPH31 - ELECTRICITY
(For those admitted in June 2014 and later)

Contact hours per week : 04
Total number of hours per semester : 60
Total number of Credits : 04

Objectives:

To enable the students

1. To understand the concepts of electric field and electro potential
2. To understand Coulomb's law and Gauss's law
3. To inspire on self study.

Unit – I

Gauss' Law : (12hrs)

A new look at Coulomb's law – Flux – Flux of an Electric field – Gauss' law - Gauss' law and Coulomb's law – A charged isolated conductor - Applying Gauss' Law – Cylindrical symmetry – Nonconducting sheet – Two conducting plates – Spherical symmetry.

Unit – II

Electric Potential (12hrs)

Electric Potential Energy – Electric Potential – equipotential surfaces - Calculating the Potential from the field – Potential due to a Point Charge – Potential due to a group of Point Charges - Potential due to an electric dipole - Potential due to a Continuous Charge Distribution – Calculating the field from the Potential

Unit – III

Capacitance (12hrs)

The uses of Capacitors – Capacitance – Calculating the Capacitance – capacitors in series and parallel - Energy stored in an Electric Field – Capacitor with a Dielectric – Dielectrics: an atomic view - Dielectrics and Gauss' law.

Unit – IV

Circuits (12hrs)

Pumping charges – Work, energy and emf – calculating the current in a single loop circuit – Other single loop circuits - Potential differences – Multiloop circuits – The ammeter and the voltmeter – RC circuits.



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DEPARTMENT OF PHYSICS

NEW COURSES INTRODUCED

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2014 AND LATER

Unit – V

Alternating Current Circuits

(12hrs)

Alternating current- Forced Oscillations- Three simple circuits-The series RLC circuit- Power in alternating current circuits –Transformers .

Text Books:

1. Halliday/ Resnick /Walker - Fundamentals of Physics – Extended-
Sixth edition
John Wiley & Sons. Inc.

Unit I -	Chapter 24 Section 24.1 – 24.9(Pg.no. 543-558)
Unit II -	Chapter 25 Section 25.1 – 25.9(Pg.no. 564-578)
Unit III -	Chapter 26 Section 26.1 – 26.8(Pg.no.588-605)
Unit IV -	Chapter 28 Section 28.1– 28.8(Pg.no.633-651)
Unit V -	Chapter 33 Section 33.6– 33.11(Pg.no.778-794)

Reference Book:

R.Murugeshan

- Electricity and Magnetism
S. Chand & Company LTD
Seventh Revised Edition
Reprint with correction 2008.



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DEPARTMENT OF PHYSICS
B.Sc. PHYSICS
SEMESTER III

MAJOR COURSE

14UPH32 - ELECTROMAGNETISM

(For those admitted in June 2014 and later)

Contact hours per week : 03
Total number of hours per semester : 45
Total number of Credits : 03

Objectives:

To enable the students

1. to acquire knowledge about the properties of magnetic materials
2. to understand the concepts of magnetic field & torque.
3. to understand the phenomenon of electromagnetic induction
4. to apply Biot-Savart's law and Ampere's law to magnetic phenomena.
5. to apply electromagnetic oscillations in LC circuits.
6. to realise the significance and use of Maxwell's Equations.
7. to inspire on self study.

Unit – I

The Magnetic Field of a Current: (9hrs)

Magnetic force on a moving charge - Magnetic force on a current carrying wire - Torque on a Current Loop - The magnetic field due to a moving charge - The magnetic field of a current - Two Parallel Currents - The magnetic field of a Solenoid - Ampere's Law.

Unit – II

Faraday's Law of Induction: (9hrs)

Inductance - Calculating the Inductance - LR Circuit - Energy storage in a Magnetic Field - Electromagnetic oscillations : Quantative and Qualitative Analysis - Damped and Forced oscillations.

Unit – III

Magnetic Properties of Materials : (9hrs)

The magnetic Dipole - Force on a dipole in a non uniform field- Atomic and Nuclear Magnetism - Magnetization - Magnetic Materials.

Unit – IV

Maxwell's Equations and Electro Magnetic Waves : (9hrs)

The Basic Equations of Electromagnetism - Induced Magnetic Fields and the Displacement current - Maxwell's Equations - Generating an Electromagnetic Wave - Travelling Waves and Maxwell's Equations.

Unit – V

Polarization : (9hrs)

Polarization of electromagnetic waves - Polarizing sheets - Polarization by reflection - Double refraction - Circular polarization - Optical activity.



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Text Book:

1. Robert Resnick, David Halliday,
Kenneth S. Krane – Physics – Volume 2
John Wiley & Sons, Inc
Fifth Edition, 2004

Unit I -	Chapter 32 Sections 32.2, 32.5, 32.6 Chapter 33 Sections 33.1 – 33.5 Page No : 727 - 731, 736 to 740, 749 to 764
Unit II -	Chapter 36 Sections 36.1 – 36.7 Page No : 823 to 835
Unit III -	Chapter 35 Sections 35.1 – 35.5 Page No : 801 to 811
Unit IV -	Chapter 38 Sections 38.1 – 38.5 Page No : 861 - 870
Unit V -	Chapter 44 Sections 44.1 – 44.5 Page No : 999 to 1008

Reference Book :

D.N. Vasudeva - Fundamentals of Magnetism and Electricity
S. Chand and Company Limited
Twelfth Revised Edition, 1983

R. Murugesan
Electricity and Magnetism
S. Chand & Company LTD
Seventh Revised Edition
Reprint with correction 2008.



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DEPARTMENT OF PHYSICS
B.Sc. PHYSICS
SEMESTER V

MAJOR COURSE
14UPH62 - WAVE MECHANICS

(For those admitted in June 2014 and later)

Contact hours per week : 05
Total number of hours per semester : 75
Total number of Credits : 05

Objectives:

To enable the students

- 1.To understand the basic concepts in Wave Mechanics.
- 2.To apply wave mechanics to solve simple problems.
- 3.To inspire on self study.

Unit – I

ORIGIN OF THE QUANTUM THEORY (15 hrs)

Limitations of Classical Physics – Planck's Quantum Hypothesis – Einstein's Theory of Photoelectric Effect – Compton Effect – Quantum Theory of Specific Heat – Bohr Model of Hydrogen Atom – Existence of Stationary States – Wilson-Sommerfeld Quantization Rule – Elliptic Orbits of Hydrogen Atom – The Harmonic Oscillator – The Rigid Rotator – Particle in a Box – The Correspondence Principle – The Stern-Gerlach Experiment – Inadequacy of Quantum theory.

Unit – II

WAVE MECHANICAL CONCEPTS (15 hrs)

Wave Nature of Particles – The Uncertainty Principle – The Principle of Superposition – Wave Packet – Time-dependent Schrodinger Equation – Interpretation of the Wave Equation – Ehrenfest's Theorem – Time-independent Schrodinger Equation – Stationary States – Admissibility conditions on the Wave Function.

Unit – III

GENERAL FORMALISM (15hrs)

Linear Vector Space – Linear Operator – Eigen Functions and Eigen Values – Hermitian Operator – Postulates of Quantum Mechanics – Simultaneous measurability of observables-General Uncertainty relation.

Unit – IV

ONE DIMENSIONAL ENERGY EIGEN VALUE PROBLEMS (15hrs)

Square-well Potential with Rigid Walls – Square-well Potential with Finite Walls – Square Potential Barrier – Alpha Emission- Linear Harmonic Oscillator: Schrodinger Method



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DEPARTMENT OF PHYSICS

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2014 AND LATER

Unit –V

THREE DIMENSIONAL ENERGY EIGEN VALUE PROBLEMS (15hrs)

Particle Moving in a Spherically Symmetric Potential – System of Two Interacting Particles – Rigid Rotator – Hydrogen Atom- Three-Dimensional square well potential.

Text Books:

1. G. Aruldas – Quantum Mechanics
Prentice-Hall of India Private Limited
Unit I - Chapter 1
Sections 1.1-1.15
Unit II - Chapter 2
Section 2.1-2.10
Unit III - Chapter 3
Sections 3.1 – 3.7
Unit IV - Chapter 4
Section 4.1-4.4, 4.7
Unit V - Chapter 5
Sections 5.1 – 5.4, 5.7

Reference Books:

1. P.M.Mathews - A Text Book on Quantum Mechanics
and K.Venkatesan - Tata McGraw Hill Publishing Company Limited
33rd Reprint
2. Sathya Prakash - Advanced Quantum Mechanics
Kedar Nath Ram Nath Publishers, Meerut
Fifth Revised and enlarged Edition 1999



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DEPARTMENT OF PHYSICS
M. Sc Physics – Programme code: 14PPH
(For those who have joined in June 2014 and later)

New Course Details

Course code	Course Title
14PPH3E1	CSIR-NET Prelims-Physics


Dr. (Mrs) S. SIVA DEVI
HOD of Physics
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SIVAKASI - 626 123.


Dr. T. Palaneeswari
PRINCIPAL
The Standard Fireworks Rajaratnam
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DEPARTMENT OF PHYSICS
M.Sc. Physics
(For those who have joined in 2014 and later)
CHOICE BASED CREDIT SYSTEM
PROGRAMME CODE – 14PPH
PROGRAMME SCHEME

Semester	Course Code	Course Title	Teaching Hours Per Week	Credits	Duration of Exam (Hours)	Marks Allotted		
						Internal	External	Total
I	Core Courses		6	5	3	25	75	100
	14PPH11	Mathematical Physics						
	14PPH12	Advanced Classical Mechanics	6	4	3	25	75	100
	14PPH13	Linear Integrated Circuits	6	4	3	25	75	100
	14PPH1L	Practical – I	6	4	5	40	60	100
	14PPH1E1/ 14PPH1E2/ 14PPH1E3	Elective Course I Nanophysics/Microprocessors/ Microcontroller	6	5	3	25	75	100
Total			30	22			500	
II	14PPH21	Core Courses Quantum Mechanics – I	6	5	3	25	75	100
	14PPH22	Statistical Mechanics		4	3	25	75	100
	14PPH23	Electromagnetic Theory	6	4	3	25	75	100
	14PPH2L	Lab – II	6	4	5	40	60	100
	14PPH2E	Elective Course II Applied Physics	6	5	3	25	75	100
	Total			30	22			500
III	Core Courses		6	5	3	25	75	100
	14PPH31	Solid State Physics –I						
	14PPH32	Quantum Mechanics – II	6	4	3	25	75	100
	14PPH33	Computer Oriented Numerical Methods	6	4	3	25	75	100
	14PPH3L	Practical – III	6	4	5	40	60	100
	14PPH3E/ 14PPH3E1	Elective Course III Medical Physics CSIR-UGC NET Prelims- Physics	6	5	3	25	75	100
Total			30	22			500	
IV	14PPH41	Core Courses Solid State Physics –II	6	5	3	25	75	100

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14PPH42	Nuclear Physics	6	5	3	25	75	100
14PPH43	Molecular Spectroscopy	6	4	3	25	75	100
14PPH4E1/ 14PPH4E2	Elective Course IV Advanced Digital Electronics/ Recent Trends in Physics	6	5	3	25	75	100
14PPH4P	Project and viva voce	6	5	-	-	100	100
Total		30	24				500

ELECTIVE COURSE OFFERED FOR OTHER MAJOR STUDENTS

Semester	Course Code	Course Title	Teaching Hours Per Week	Credits	Duration of Exam (Hours)	Marks Allotted		
						Internal	External	Total
II	14PPH2E	Applied Physics	6	5	3	25	75	100


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ELECTIVE COURSE OFFERED FOR OTHER MAJOR STUDENTS

Semester	Course Code	Course Title	Teaching Hours Per Week	Credits	Duration of Exam (Hours)	Marks Allotted		
						Internal	External	Total
II	HLPH2E1/ HLPH2E2	Applied Physics/ Microcontroller	6	5	3	25	75	100


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DEPARTMENT OF PHYSICS
M.Sc. PHYSICS
SEMESTER – III

ELECTIVE COURSE
HLPH3E1– CSIR UGC-NET Preparatory course - Physics
(For those admitted in June 2017 and later)

Contact hours per week : 06
Total number of hours per semester : 90
Number of credits : 05

Course Outcomes (CO):

On successful completion of the course, the learners should be able to

CO1: solve problems using mathematical concepts.

CO2: apply classical, quantum and thermodynamical concepts to solve problems

CO3: solve problems on electromagnetic waves

CO4: apply various concepts of atomic, nuclear and molecular physics to solve problems

CO5: apply different laws to solve problems in electronics

CO-PO Mapping table (Course Articulation Matrix)

POs \ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	1	0	0	0	0	0	1
CO2	3	9	9	0	0	0	1
CO3	9	9	9	0	0	0	1
CO4	9	9	9	0	0	0	1
CO5	9	9	9	0	0	0	1
Weightage of the course	31	36	36	0	0	0	5
Weighted percentage of Course contribution to POs	5.96	6.88	8.53	0	0	0	7.58

UNIT I

(18 hrs)

Mathematical Methods of Physics:

Dimensional analysis; Vector algebra and vector calculus; Linear algebra, matrices, Cayley Hamilton theorem, eigenvalue problems; Linear differential equations; Special functions (Hermite, Bessel, Laguerre and Legendre); Fourier series, Fourier and Laplace transforms; Elements of complex analysis: Laurent series-poles, residues and evaluation of integrals; Elementary ideas about tensors; Introductory group theory, SU(2), O(3); Elements

Approved in the Academic Council meeting held on 13.6.2019

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of computational techniques: roots of functions, interpolation, extrapolation, integration by trapezoid and Simpson's rule, solution of first order differential equations using Runge-Kutta method; Finite difference methods; Elementary probability theory, random variables, binomial, Poisson and normal distributions. Analytic functions: Taylor series, central limit theorem.

UNIT II (18 hrs)

Classical, Quantum and Statistical Mechanics:

Variational principle, Lagrangian and Hamiltonian formalisms and equations of motion; Poisson brackets and canonical transformations; Symmetry, invariance and conservation laws, cyclic coordinates; Periodic motion, small oscillations and normal modes; Special theory of relativity, Lorentz transformations, relativistic kinematics and mass-energy equivalence. Commutators and Heisenberg's uncertainty principle; Matrix representation; Dirac's bra and ket notation; Schrodinger equation (time-dependent and time-independent); Eigenvalue problems such as particle-in-a-box, harmonic oscillator, etc.; Tunneling through a barrier; Time-independent perturbation theory and applications; Variational method; WKB approximation; Time dependent perturbation theory and Fermi's Golden Rule; Selection rules; Semi-classical theory of radiation; Elementary theory of scattering, phase shifts, partial waves, Born approximation; Identical particles, Pauli's exclusion principle, spin-statistics connection; Relativistic quantum mechanics: Klein Gordon and Dirac equations. Laws of thermodynamics and their consequences; Maxwell relations; Classical and quantum statistics, ideal Fermi and Bose gases; Principle of detailed balance; Blackbody radiation and Planck's distribution law; Bose-Einstein condensation; Random walk and Brownian motion.

UNIT III: (18 hrs)

Electromagnetic Theory

Electrostatics: Gauss' Law and its applications; Laplace and Poisson equations, boundary value problems; Magnetostatics: Biot-Savart law, Ampere's theorem, electromagnetic induction; Maxwell's equations in free space and linear isotropic media; boundary conditions on fields at interfaces; Scalar and vector potentials; Gauge invariance; Electromagnetic waves in free space, dielectrics, and conductors; Reflection and refraction, polarization, Fresnel's Law, interference, coherence, and diffraction; Dispersion relations in plasma; Lorentz invariance of Maxwell's equations; Transmission lines and wave guides; Dynamics of charged particles in static and uniform electromagnetic fields; Radiation from moving charges, dipoles and retarded potential.

UNIT IV: (18 hrs)

Atomic, Nuclear & Molecular Physics

Spectrum of Hydrogen, helium and alkali atoms; Relativistic corrections for energy levels of hydrogen; Hyperfine structure and isotopic shift; width of spectral lines; LS & JJ coupling; Zeeman, Paschen Back & Stark effect; X-ray spectroscopy; Electron spin resonance, Nuclear magnetic resonance, chemical shift; Rotational, vibrational, electronic, and Raman spectra of diatomic molecules; Frank – Condon principle and selection rules; Spontaneous and stimulated emission, Einstein A & B coefficients; Lasers, optical pumping,



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population inversion, rate equation; Modes of resonators and coherence length. Deuteron problem; Evidence of shell structure, single- particle shell model, its validity and limitations; Rotational spectra; Elementary particles (quarks, baryons, mesons, leptons); Spin and parity assignments, isospin, strangeness; Gell-Mann-Nishijima formula; C, P, and T invariance and applications of symmetry arguments to particle reactions, parity non-conservation in weak interaction; Relativistic kinematics.

UNIT V: (18 hrs)

Electronics and Experimental methods:

Optoelectronic devices, including solar cells, photodetectors, and LEDs; High-frequency devices, including generators and detectors; Operational amplifiers and their applications; Digital techniques and applications (registers, counters, comparators and similar circuits); A/D and D/A converters; Microprocessor and microcontroller basics; Precision and accuracy, error analysis, propagation of errors, least squares fitting.

Reference Books

Unit – I

1. S. Sathya Prakash, Mathematical Physics with Classical Mechanics, Chand & Sons, New Delhi, 5th Revised Edition, 2006.

Unit – II

1. Leonard I. Schiff, Quantum Mechanics, McGraw Hill International Edition, 3rd Edition, 1968.
2. S. Sathya Prakash, Mathematical Physics with Classical mechanics, Chand & Sons, New Delhi, 5th Revised edition, 2006.

Unit – III

1. John R. Reitz, Frederick J. Milford, Robert W. Christy, Foundation of Electromagnetic Theory, Narosa Publishing House, 3rd Edition, 12th Reprint, 1998.

Unit – IV

1. Arthur Beiser, Concepts of Modern Physics – 5th Edition, International Edition.
2. T. G. Tayal, Nuclear Physics, Himalaya Publishing Company, 4th Edition.

Unit – V

1. Donald P. Leach & Albert Paul Malvino, Digital Principles and Applications, TATA McGraw – Hill Publishing Company, 4th Edition.