SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN`S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University)

(Accredited with "A" Grade by NAAC; An ISO 9001:2015 Certified Institution)

SUNDARAKKOTTAI, MANNARGUDI – 614016.

TAMILNADU, INDIA

B.Sc., PHYSICS

COURSE STRUCTURE UNDER CBCS

(For the candidates admitted in the academic year 2020–2021)

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University)

(Accredited with "A" Grade by NAAC; An ISO 9001:2015 Certified Institution)

SUNDARAKKOTTAI, MANNARGUDI – 614016.

TAMILNADU, INDIA

B.Sc., PHYSICS COURSE STRUCTURE UNDER CBCS

(For the candidates admitted in the academic year 2020–2021)

ELIGIBILITY: Those who have completed +2 examinations with Physics, and Mathematics two of the core subjects.

Sem.	Part	Nature of the Course	Course Code	Title of the Course	Inst. Hours/ Week	Credit	Exam Hours	Marks		Total
								CIA	ESE	
I	I	Language Course (LC) –I– Tamil */Other Languages ** #	20LC101	Ikkala Ilakkiyam	6	3	3	25	75	100
	II	English Language Course (ELC) – I	20ELC101	Prose and Communication Skills	6	3	3	25	75	100
	III	Core Course (CC) – I	20PH101	Properties of Matter and Acoustics	6	5	3	25	75	100
		Core Practical (CP) – I	20PH102P	Physics Practical I	3	3	3	40	60	100
		Allied Course (AC) – I	20AMM101	Calculus	4	3	3	25	75	100
		Allied Course–II (AC)	20AMM102	Algebra and Analytical Geometry, 3D	3	2	3	40	60	100
	IV	Value Education		Value Education	2	2	3	25	75	100
	Total				**30**					
II	I	Language Course (LC) –II– Tamil*/Other Languages ** #	20LC201	Idaikkala Ilakkiyamum Puthinamum	6	3	3	25	75	100
	II	English Language Course (ELC) – II	20ELC201	Poetry and Communication	6	3	3	25	75	100
	III	Core Course (CC) – II	20PH203	Mechanics	6	5	3	25	75	100
		Core Practical (CP) – II	20PH204P	Physics Practical II	3	3	3	40	60	100
		Allied Course–(AC)-III	20AMM203	Trigonometry and Fourier Series	3	2	3	25	75	100
		Allied Course–(AC)-IV	20AMM204	ODE, PDE and Laplace Transforms	4	3	3	40	60	100
	IV	Environmental Studies	-	Environmental Studies	2	2	3	25	75	100
	Total				**30**					
III	I	Language Course (LC) – III Tamil*/Other Languages ** #	20LC301	Kappiyamum Nadagamum	6	3	3	25	75	100
	II	English Language Course (ELC) – III	20ELC301	Language Through Literature-III(Drama and Communication skills)	6	3	3	25	75	100
	III	Core Course (CC) – III	20PH305	Thermal Physics	6	5	3	25	75	100
		Core Practical (CP) – III	20PH306P	Physics Practical-III	3	3	3	40	60	100
		Allied Course (AC) –I	20ACS301	Introduction to Computer and Office Automation	4	4	3	25	75	100
		Allied Course (AP) –I	20ACS302P	Allied Practical-I(AP) (Office Automation Lab)	3	2	3	40	60	100

	IV	Non Major Elective (NME) –I -for those who studied Tamil under Part-I a) Basic Tamilfor other language students b) Special Tamil for those who studied Tamil up to +2 but opt for other languages in degree programme	20NMEPH31	Energy Physics	2	2	3	25	75	100
	Total				**30**					
IV	I	Language Course (LC) –IV - Tamil*/Other Languages ** #	20LC401	Pandaya Ilakkiyam	6	3	3	25	75	100
	II	English Language Course (ELC) – IV	20ELC401	Language Through Literature-IV (Short Stories and Communication skills)	6	3	3	25	75	100
	III	Core Course (CC) – IV	20PH407	Electricity, Magnetism and Electromagnetism	5	5	3	25	75	100
		Core Practical (CP)– IV	20PH408P	Physics Practical-IV	3	3	3	40	60	100
		Allied Course – (AC)-II	20ACS403	Fundamentals of 'C' Programming	3	2	3	25	75	100
		Allied Course – (AP)-II	20ACS404P	Allied Practical -II (AP) (Computer Programming Lab using 'C')	3	2	3	40	60	100
	IV	Non Major Elective (NME) – II - for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil up to +2 but opt for other languages in degree programme	20NMEPH42	Laser Physics	2	2	3	25	75	100
		Skill Based Elective (SBE) – I	20SBEPH1	Fiber Optic Communication	2	2	3	25	75	100
	Total				**30**					
V	III	Core Course (CC) – V	20PH509	Optics	5	5	3	25	75	100
		Core Course (CC) – VI	20PH510	Atomic and Molecular Physics	5	5	3	25	75	100
		Core Course (CC) – VII	20PH511	Electronics	6	5	3	25	75	100
		Core Practical (CP) – V	20PH512P	Physics Practical – V	3	3	3	40	60	100
		Major Based Elective (MBE) – I	20MBEPH1	Material Science	5	5	3	25	75	100
	IV	Skill Based Elective (SBE) – II	20SBEPH2	Satellite Communication	2	2	3	25	75	100
		Skill Based Elective(SBE) – III	20SBEPH3	Mobile Communication	2	2	3	25	75	100
		Soft Skills Development	-	Soft Skill Development	2	2	3	25	75	100
	Total				**30**					
VI	III	Core Course (CC) – VIII	20PH613	Nuclear Physics	6	5	3	25	75	100
		Core Course (CC) – IX	20PH614	Theoretical Physics	6	5	3	25	75	100
		Core Practical (CP) – VI	20PH615P	Physics Practical – VI	5	3	3	40	60	100
		Major Based Elective (MBE) – II	20SBEPH2	Microprocessor and 'C' Programming	6	5	3	25	75	100

		Project (CC-X)	20PHPW	Project	6	5	3	25	75	100
	V	Extension Activities		Extension Activities	-	1	-	-	-	-
		Gender Studies		Gender Studies	1	1	3	25	75	100
	Total				**30**					
Grand Total					**180**					**4300**

CURRICULAM DESIGN

LIST OF ALLIED COURSES

ALLIEDCOURSEI-MATHEMATICS **ALLIED COURSE II-COMPUTERSCIENCE**

Subject	No. of Courses	Total Credits
Language Part – I	4	12
English Part –II	4	12
Core Course	9	45
Core Practical	6	18
Allied Course	6	16
Allied Practical	2	4
Non-Major Elective	2	4
Skill Based Elective	3	6
Major Based Elective	2	10
Project	1	5
Environmental Studies	1	2
Value Education	1	2
Soft Skill Development	1	2
Gender Studies	1	1
Extension Activities	-	1
	43	**140**

* For those who studied Tamil upto 10^{th} +2 (Regular Stream)

+ Syllabus for other Languages should be on par with Tamil at degree level

those who studied Tamil upto 10^{th} +2 but opt for other languages in degree level under Part I should study special Tamil in Part IV

** Extension Activities shall be outside instruction hours

Note:

	CIA	ESE
1. Theory	25	75
2. Practical	40	60

3. Separate passing minimum is prescribed for CIA and ESE

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for ESE shall be 40% out of 75 marks [i.e. 30 marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]

The passing minimum for ESE shall be 40% out of 60 marks [i.e. 24 marks]

NON MAJOR ELECTIVE (NME) OFFERED BY THEDEPARTMENT

Semester	Part	Course	Title of the Paper
III	**IV**	NME –I	Energy Physics
IV		NME –II	Laser Physics

SKILL BASED ELECTIVE (SBE) OFFERED BY THEDEPARTMENT

Semester	Part	Course	Title of the Paper
IV	**IV**	SBE-I	Fiber Optic Communication
V		SBE-II	Satellite Communication
V		SBE-III	Mobile Communication

******

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University)

(Accredited with "A" Grade by NAAC; An ISO 9001:2015 Certified Institution)

SUNDARAKKOTTAI, MANNARGUDI – 614016.

TAMILNADU,INDIA

DEPARTMENT OFPHYSICS

B.Sc., PHYSICS

(For the candidates admitted in the academic year 2020–2021)

Question Paper Pattern-(Theory)

Max time:3 Hours **Max Marks:7**

Section – A (10 x 2 = 20)
Answer all the questions
Answer in One or Two sentences each

1
2. Unit I
3.
4. Unit II
5.
6. Unit III
7.
8. Unit IV
9.
10. Unit V

Section – B (5 x 5 =25)
Answer all the questions
Each answer should not exceed 500 words

11. a(or)
b Unit I
12. a(or)
b Unit II
13. a(or)
b Unit III
14. a(or)
b Unit IV
15. a(or)
b Unit V

Section – C (3 x 10 = 30)
Answer any <u>THREE questions</u> in 1200 words

16 Unit I
17 Unit II
18 Unit III
19 Unit IV
20 Unit V

SEMESTER I

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI - 614016.

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: I-CC- I: PROPERTIES OF MATTER AND ACOUSTICS

Ins. Hrs./Week:6 **Course Credit: 5** **Course Code: 20PH101**

OBJECTIVES:

- To identify the characteristics of matter in terms of their properties.
- To identify physical properties of matter.
- To acquire the knowledge about the concept of Surface Tension.
- To understand the dynamic property of fluids.
- To know the basic principles of acoustics.

UNIT I ELASTICITY

Introduction-Hooke's law – Stress-Strain diagram – Factors affecting elasticity- Different moduli of elasticity - Relation between the elastic moduli – Poisson's ratio –Twisting couple on a cylinder – Determination of rigidity modulus by static torsion – Work done in twisting a wire -Torsional oscillations of a Body-Torsion pendulum - Determination of rigidity modulus and moment of inertia.

UNIT II BENDING OF BEAMS

Bending of beams - Expression for bending moment – Cantilever – Expression for depression of the loaded end of a cantilever — Young's modulus by measuring the tilt in a loaded cantilever – Oscillation of a cantilever - Non-uniform bending – Expression for depression- Uniform bending – Expression for elevation –Experimental determination of Young's modulus using pin and microscope method (Non-uniform bending – Uniform bending) - Determination of Young's modulus by Koenig's method.

UNIT III SURFACE TENSION

Definition – Molecular forces – Explanation of surface tension on kinetic theory – Surface energy –Work doneonincreasingtheareaofasurface-Angleofcontact-Neumann'striangle-Excesspressureinsidealiquid dropandsoapbubble-Excesspressureinsideacurvedliquidsurface–Forcebetweentwoplatesseparatedby a thin layer of a liquid – Experimental determination of surface tension - Jaegar's method - Drop- weight method - Capillary rise method - Variation of surface tension with temperature.

UNIT IV VISCOSITY

Newton'slawofviscousflow–streamlinedandturbulentmotion–Reynold'snumber-Poiseuille'sformula for the flow of a liquid through a horizontal capillary tube – Experimental determination of co-efficient of a liquid by Poiseuille's method -Ostwald's viscometer – Terminal velocity and Stoke's formula - Viscosity of gases – Meyer's formula - Rankine's method -Variation of viscosity with temperature and pressure - Lubrication.

UNIT V ACOUSTICS

Reverberation – Sabine's Reverberation formula – Factors Affecting the Acoustics of Buildings – Sound distributioninanAuditorium–Requisitesforgoodacoustics–UltrasonicsProductionanddetectionbyPiezo electric method.

COURSE OUTCOME:

1. Analyze and comprehend regarding the strength of the solid materials of different size.
2. Understand the physical properties of matter.
3. Study the concept of Surface Tension.
4. Learn the dynamic properties of fluids.
5. Acquire the knowledge about the concept of Acoustics.

TEXT BOOK(S):

1. R. Murugeshan, Properties of matter, S. Chand & Co. Pvt. Ltd., Revised edition,2019.

2. Brijlal & N. Subramanian, 'A Text Book of Sound', Vikas Publishing. Pvt.Ltd,2008.

REFERENCE BOOK(S):

1. Fundamentals of General properties of matter, S. Chand &Co. Pvt. Ltd,2012.
2. Brijlal& N. Subramanian, Properties of matter, Vikas Publishing. Pvt. Ltd,2005.
3. R.L. Saihgal, A Text Book of Sound, S. Chand & Co. Pvt. Ltd, New Delhi,1979.

E_RESOURCES:

1.http://shorturl.at/dkux4
2.https://cutt.ly/Vhlco3J
3.https://youtu.be/amGa5RRrCss

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI - 614016.

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: I-CP- I: PRACTICAL I

Ins. Hrs./Week:3 **Course Credit: 3** **Course Code: 20PH102P**

(Any Ten Experiments)

OBJECTIVES:

- To motivate and educate the students to acquire skill in physics Experiments.

1. Young's modulus - Uniform bending - Pin & Microscope Method.
2. Young's modulus - Non uniform bending - Pin & Microscope Method.
3. Surface Tension, Interfacial Surface Tension – Drop weight Method.
4. Moment of Inertia – Torsion pendulum.
5. Sonometer – Determine the frequency of a given tuning fork
6. Spectrometer – Refractive index of a solid prism.
7. Surface Tension by Capillary rise method.
8. Long focus convex lens - f, R, refractive index-determination.
9. Newton's ring's – Determination of radius of curvature of a given convex lens.
10. Stokes method – Viscosity of highly viscous liquid.
11. Determination of the Elastic Constants of a Wire by Searle's method.
12. Comparison of Viscosities of two liquids – Ostwald's Viscometer/ HARE's Apparatus.
13. Young's Modulus by Uniform Bending – Optic Lever method.
14. Determine the diameter of the material using Travelling microscope.
15. Determine the coefficient of a liquid – Poiseuille's method.

COURSE OUTCOME:

1. Perform experiments on any material to identify the strength the given objects.
2. Deal with liquids based on their viscosity.
3. Commend on the relation between frequency, length and tension of a stretched string under vibration.

TEXT BOOK(S):

1. Dr. S. Somasundaram, Practical Physics, Apsara Publications, Tiruchirappalli, 2012.

REFERENCE BOOK(S):

1. S. Srinivasan, A Text Book of Practical physics, S. Sultan Chand publications.2005
2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi,2011.

E_RESOURCES:

https://youtu.be/GTnPEtksTEc
https://youtu.be/veQ-LfJhfxMhttps://youtu.be/hV0qG7BTJJI

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI - 614016.

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS

ALLIED COURSE – I

(For Physics & Chemistry

Semester : I – AC – I : CALCULUS

Ins. Hrs. /Week : 4 **Course Credit: 3** **Course Code :20AMM101**

OBJECTIVES :

- To learn the basic need for their major concepts.
- To train the students in the basic Integrations.
- To introduce the notion of curvature, radius and centre of curvature.

UNIT I

Successive Differentiation – n^{th} derivative of standard functions (Derivation not needed) - Leibnitz Theorem (proof not needed) and its applications - Simple problems in all these.

UNIT II

Total differential coefficients (proof not needed) - Curvature and radius of curvature in Cartesian only (proof not needed) – Centre of curvature (proof not needed) - Simple problems in all these.

UNIT III

Evaluation of integrals of types

1) $\int \frac{\square\square+\square}{\square\square^2+\square\square+\square}\,\square\square$ 2) $\int \frac{\square\square+\square}{\sqrt{\square\square^2+\square\square+\square}}\,\square\square$ 3) $\int \frac{\square\square}{\square\square^2+\square\square+\square}\sqrt{(\square+\square)}$

4) $\int \frac{\square\square}{\square+\square\square\square\square}$ 5) $\int \frac{\square\square}{\square+\square\square\square\square}$

Integration by trigonometric substitution

1) $\int\sqrt{\square^2-\square^2}\,\square\square$ 2) $\int\sqrt{\square^2+\square^2}\,\square\square$ 3) $\int\sqrt{\square^2-\square^2}\,\square\square$

UNIT IV

General properties of definite integrals- Integration by parts - Reduction formula (when n is a positive integer) for

1) $\int \square^{\square}\square^{\square}\,\square\square$ 2) $\int \square^{\square}\square\square\square\square\square\square$ 3) $\int \square\square\square^{\square}\square\square\square$

4) $\int \square\square\square^{\square}\ \square\square\square$ 5) $\int_0^{\square} \square^{\square}\ \square^{\square}\ \square\square$ 6) $\int_0^{\frac{\square}{2}} \square\square\square^{\square}\ \square\square\square$

7) Without proof $\int_0^{\frac{\square}{2}} \square\square^{\square}\square\square\square^{\square}\square\square\square$ – and illustrations

UNIT V

Double integrals – Changing the order of integration – Triple integrals (Cartesian only).

COURSE OUTCOME :

After the completion of the course the students will be able to

1. Understand the concept of successiveDifferentiation.
2. Learn the notation of curvature and radius ofcurvature.
3. Solve the problems in integration using variousmethods.
4. Understand the concept of properties of definite integrals, integration by parts and reductionformulae.
5.Understand the concept of double and tripleintegrals.

TEXT BOOK(S) :

1. S.Narayanan and T.K. Manichavasagampillai, Calculus, Volume I, S.Viswanathan Pvt. Limited,2003.
2. S.Narayanan and T.K. Manichavasagampillai, Calculus, Volume II, S.ViswanathanPvt, Limited,Chennai 2011.

UNIT-I	Chapter3	: Sec. 1.1 to 1.6, 2.1, 2.2 of[1]
UNIT-II	Chapter8	: Sec. 1.3 to 1.5 & Chapter 10 : Sec. 2.1 to 2.4 of[1]
UNIT- III	Chapter1	: Sec. 7.3, 7.4, 8, 9 of [2]
UNIT-IV	Chapter1	: Sec. 11, 12, 13.1 to 13.5 of[2]
UNIT-V	Chapter5	: Sec. 2.1, 2.2, 4 of [2]

REFERENCE BOOK(S):

1.Hari Krishan, Calculus, Atlantic publishers & distributions (P) Ltd,2013.
2. U.P.Singh, R.J.Srivastava, N.H.Siddiqui, Calculus, Dominant publishers and Distributors, New Delhi-2003

E_RESOURCES :

1. file:///C:/Users/ELCOT/Downloads/AnElementaryTreatiseontheDifferentialandIntegralCalculus_10449393.pdf
2. http://djm.cc/library/Elements_Differential_Integral_Calculus_Granville_edited_2.pdf

****

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS),

SUNDARAKKOTTAI, MANNARGUDI – 614016.

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS

ALLIED COURSE – II

(For Physics & Chemistry)

Semester : I – AC – II : ALGEBRA AND ANALYTICAL GEOMETRY (3D)

Ins. Hrs. /Week : 3 **Course Credit: 2** **Course Code :20AMM102**

OBJECTIVES :

- To inculcate the basics concept of Algebra.
- To give depth knowledge of matrices and inculcate habit of problem solving.
- To enable the students to develop their skill in three dimensions.

UNIT I

Binomial and Exponential Series (Proof not needed) Only- Summation and Approximation of the series (related problems Only)

UNIT II

Non-Singular, Symmetric, Skew symmetric, Orthogonal, Hermitian, Skew Hermitian and Unitary matrices–Characteristicequation,Eigenvalues,Eigenvectors–CayleyHamilton'sTheorem(proofnot needed) related problems only.

UNIT III

Standard equation of a plane – Intercept form – Equation of the Plane Passing through the points – Angle between the planes.

UNIT IV

Symmetrical form of straight line – Straight line passing through two points – Angle between the plane – Coplanar lines – Shortest distance between two lines.

UNIT V

Equation of a sphere – Equation of a sphere Passing through a circle – Intersection of two spheres is a circle – Tangent plane to the Sphere.

COURSE OUTCOME :

After the completion of the course the students will be able to

1. Learn the binomial theorem and its summation and approximations.
2. Understand the types of matrices and its definitions and compute the eigen value and eigen vectors
3. Learn the angle between planes, bisector planes, perpendicular distance from a point to a plane and intersection of two lines.
4. Compute the angle between a line and a plane, length of perpendicular from a point to a line.
5. Understand the equation of a plane passing through the circle and tangent of the plane.

TEXT BOOK(S) :

1. T.K.Manicavachagam Pillai, T.Natarajan, K.S.Ganapathy, Algebra,Vol. I, S.Viswanathan Pvt Limited, Chennai,2007.

2.T.K.Manicavachagam Pillai, T.Natarajan, K.S.Ganapathy, Algebra, Vol. II, S.Viswanathan Pvt Limited, Chennai, 2012.

3.T.K.Manicavachagam Pillai, T.Natarajan, Analytical Geometry(3D), S.Viswanathan Pvt Limited, Chennai, 2008.

UNIT-I Chapter 3 : Sec. 10 and 14 & Chapter 4: Sec. 2,3 of[1]

UNIT-II Chapter 2 : Sec. 1 to 14 and 16.2 to 16.3 of[2]

UNIT-III Chapter 2 : Sec. 1 to 9 of[3]

UNIT-IV Chapter 3 : Sec. 1 to 4, 7, 8 of[3]

UNIT-V Chapter 4 : Sec. 1 to 8 of[3]

REFERENCE BOOK(S) :

1. Sannu Rahi, Algebra, Tata McGraw Hill Publishing Company Limited, New Delhi,2009.

2. Shanti Narayan, Dr. P.K.Mittal, Analytical Solid Geometry, S.Chand & company Private limitedNew Delhi,2016.

E_RESOURCES :

1. https://www.google.com/amp/s/dokumen.tips/amp/documents/free-download-here-manickavasagam-pillai-volume-1pdf-free-download-here-algebra.html

2. https://www.academia.edu/19646465/Analytical_solid_geometry_Shanti_Narayan

****

BHARATHIDASANUNIVERSITY, TIRUCHIRAPPALLI- 620024

Applicable to the candidates admitted from the Academic year 2018-19 onwards

Part IV - VALUE EDUCATION (Revised Syllabus)

Unit I :

PhilosophyofLifeandSocialValuesHumanLifeonEarth(Kural629)PurposeofLife(Kural46) Meaning and Philosophy of Life (Kural 131, 226) Family (Kural 45), Peace in Family (Kural 1025) Society (Kural 446), The Law of Life (Kural 952), Brotherhood (Kural 807) Five responsibilities / duties of Man (a) to himself (b) to his family (c) to his environment (d) to his society, (e) to the Universe in his lives (Kural 43, 981).

Unit II :

Human Rights and Organizations Definitions, Nature of Human Rights. Universal Declaration of Human Rights,InternationalcovenentonCivilandPoliticalRights-InternationalcovenentofEconomic,Socialand CulturalRights.AmnestyInternationalRedCross.ContemporaryChallenges:ChildLabour–Women'sRight - Bonded Labour - Problems of refugees - Capital punishment. National and State Human Rights Commissions

Unit III :

RTI Act, 2005 & Consumer Protection Act, 1986 Definition of RTI Act, 2005 and obligations of Public Authorities – The Central Information Commission – The State Information Commission – Powers and Functions of the Information Commissions – Appeal and Penalties. Definition of The Consumer Protection Act,1986 – State and Central Consumer Protection Councils – Consumer Disputes Redressal Agencies.

Unit IV :

Yoga and Health Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga - Yoga Education with modern context - Different traditions and schools of Yoga - Yoga practices: Asanas, Pranayama and Meditation.

Unit V :

Role of State Public Service Commission Constitutional provisions and formation - Powers and Functions - Methods of recruitment -Rules and notification, syllabi for different exams - written and oral - placement.

BOOKS FOR REFERENCES:

1. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613004
2. Leah Levin, Human Rights, NBT,1998
3. V.R. Krishna Iyer, Dialetics and Dynamics of Human Rights in India, Tagore LawLectures.
4. Yogic Thearpy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
5. SOUND HEALTH THROUGH YOGA - Dr.K.Chandrasekaran, Prem Kalyan Publications, Sedaptti, 1999.
6. Right to Information Act, 2005-Website:www.tnpsc.gov.in/RTI%20ACT%202005.pdf
7. TheConsumerProtectionAct,1986–Website: http://ncdrc.nic.in/bare_acts/consumer%20Protection%20Act-1986.html

SEMESTER II

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI - 614016.

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: II-CC - II: MECHANICS

Ins. Hrs./Week:6 **CourseCredit:5** **Course Code: 20PH203**

OBJECTIVES:

- To understand the basic concept of mechanics.
- To understand the concept of simple pendulum.
- To gain the Knowledge of gravitation.
- To know the knowledge of Centripetal and centrifugal forces.
- To understand the basic concept of floatation.

UNIT I PROJECTILE, IMPULSE AND IMPACT

Projectile - particle projected in any direction - Path of a projectile is a parabola - Range of a projectile on plane inclined to the horizontal -Maximum range on the inclined plane - Impulse of a force - Laws of impact -Direct impact between two smooth spheres - oblique impact between two smooth spheres - Impact of a smooth sphere on a smooth fixed horizontal plane - Loss of KE due to direct impact - Oblique impact.

UNIT II MOTION ON A PLANE CURVE

Centripetal and centrifugal forces - Hodograph - Expression for normal acceleration - Motion of a cyclist alongacurvedpath-Motion of a railway carriage round a curved track-upsetting of a carriage-Motion of a carriage on a banked up curve - Effect of earth's rotation on the value of the acceleration due to gravity - Variation of 'g' with altitude, latitude and depth.

UNIT III GRAVITATION

Newton's law of gravitation-Mass and density of earth-Inertial and Gravitation mass-Determination of G-Boy's experiment -Kepler's Laws of planetary motion -Deduction of Newton's law of gravitation from Kepler's Law-Gravitation-Field-potential-Intensity of Gravitational field-gravitational potential due to a point mass - Equipotential surface -Gravitational potential and field due to a spherical shell and solid sphere

UNIT IV DYNAMICS OF RIGID BODY AND FRICTION

Moment of Inertia-Kinetic energy and angular momentum of rotating body-Theorems of perpendicular and parallel axes-Acceleration of a body rolling down an inclined plane without slipping-Oscillations of a small sphere on a large concave smooth surface - Compound pendulum – Centre of suspension and Centre of oscillation - Centre of percussion – Minimum period of a compound pendulum. Friction-Laws of friction-Resultant reaction-Angle and cone of friction-Equilibrium of a body on a rough plane inclined to the horizontal – The friction clutch.

UNIT V CENTRE OF GRAVITY, CENTRE OF PRESSURE AND FLOATING BODIES

Centre of gravity of a body - Centre of Pressure-Pascal's law- rectangular lamina-triangular lamina-Archimedes principle - Conditions of equilibrium of a floating body - Stability of equilibrium of a floating body - Meta -Centre - Experimental determination of a metacentric height of a ship.

COURSE OUTCOME:

1. Recognize the motion of the charged particle in electromagnetic field.
2. To understand the effect of gravitation on objects.
3. Analyze the pendulums of oscillation.
4. To calculate and find C.G of a various shapes.
5. Understand the concepts of floating bodies.

TEXT BOOK(S):

1. M. Narayanamurthi and N. Nagarathinam, Dynamics, The National Publishing Company 2005, Chennai.
2. M. Narayanamurthi and N. Nagarathinam, Statics, Hydrostatics and Hydrodynamics -The National Publishing Company 2005,Chennai.

REFERENCE BOOK(S):

1. R. Murugesan, Mechanics and Mathematical Physics, S. Chand & Company Ltd., New Delhi, 2008.
2. D.S. Mathur, Mechanics, S. Chand & Company Ltd., NewDelhi.

E_RESOURCES:

1. https://youtu.be/R8wKV0UQtlo
2. http://shorturl.at/lmBFL

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS),
SUNDARAKKOTTAI, MANNARGUDI - 614016.
DEPARTMENT OF PHYSICS
B.Sc., PHYSICS

Semester: II - CP - II: PRACTICAL II

Ins. Hrs./Week:3 **Course Credit : 3** **Course Code : 20PH204P**

(**Any Ten Experiments)**

OBJECTIVES:

- To motivate and educate the students to acquire skill in physics Experiments.

1. Cantilever depression—Scale and Telescope Method.
2. Potentiometer – Calibration of an Ammeter.
3. Spectrometer – μ of the hollow Prism.
4. Concave lens – Focal length determination.
5. Thermal Conductivity of the Bad Conductor – Lee's Disc Method.
6. Meter bridge - Specific resistance determination.
7. Spectrometer – Grating - Normal incidence method.
8. Meter bridge – Series and parallel circuit.
9. Specific heat capacity of liquid - Newton's law of cooling.
10. Spectrometer – Grating – wavelength of the mercury spectral lines.
11. Compound pendulum – g and k determination.
12. Joule's Calorimeter - determination of Specific heat capacity of liquid.
13. P.O box – determination of Temperature coefficient.
14. Potentiometer –Determination of resistance.
15. Determination of thickness of thin wire – Air wedge.

COURSE OUTCOME:

1. Compare the thermal conductivity of solids.
2. Analyze the heat capacity of liquids.

TEXT BOOK(S):

1. Dr. S. Somasundaram, Practical Physics, Apsara Publications, Tiruchirappalli, 2012.

REFERENCE BOOK(S):

1. S. Srinivasan, A Text Book of Practical physics, S. Sultan Chand Publications.2005
2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, New Delhi,2011.

E_RESOURCES:

1.https://youtu.be/5Rk2klHiPBc
2. https://youtu.be/N0lxwqANsd4

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI – 614 016.

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS

ALLIED COURSE –III

(For Physics &Chemistry)

Semester : II – AC – III : TRIGONOMETRY AND FOURIER SERIES

Ins. Hrs. /Week : 3 **Course Credit: 2** **Course Code :20AMM203**

OBJECTIVES :

- **To inculcate the basic concept of Trigonometry.**
- **To acquaint problem solving skills to the students in Fourier series.**
- **To learn the Fourier series expansion of periodic function with the period of2☐.**

UNIT I

Expansion of sin nθ, cos nθ, tan nθ (n being a positive integer) – Expansion of $\sin^n\theta$, $\cos^n\theta$, – Expansion of sin θ, cos θ and tan θ in terms of powers of θ (only problems in all the above)

UNIT II

Hyperbolic functions– Relation between Hyperbolic and Circular functions –Expansion of Inverse Hyperbolic functions –Separation of real and imaginary parts

UNIT III

Logarithm of a complex number – Summation of a series – Difference Method – Angles in Arithmetic Progression method.

UNIT IV

FourierSeriesDefinition–FourierSeriesExpansionofPeriodicFunctionswithperiod2☐–OddandEven Functions.

UNIT V

Half range sine and Cosine series Definition and Problems – Change of Interval

COURSE OUTCOME :

After the completion of the course the students will be able to

1. Learn the expansion of sin nθ and cos nθ and its related problems.
2. Understand the hyperbolic functions and its relation between hyperbolic and circular functions.
3. Understand the summation of series and its methods.
4. Understand the concept of Fourier series and familiarizes with odd, even Fourier series with their periodic functions.
5. Analyse the half range sine and cosine functions and its change ofinterval.

TEXT BOOK(S) :

1.S.Arumugam, A. Thangapandi Issac and A.Somasundaram, Trignometry and Fourier series, New Gamma Publications, 1999.

2. S. Narayanan and T.K.Manicavachagom Pillay, S. Viswanathan, Calculus

Volume III - Private limited, 2014.

UNIT-I Chapter 1: Sec. 1.2 to 1.4 of[1]

UNIT-II Chapter 2 : Sec. 2.1 and 2.2 of[1]

UNIT-III Chapter 3 & Chapter 4 : Sec. 4.1 to 4.3of[1]

UNIT-IV Chapter6 : Sec. 1 to 3 of[2]

UNIT-V Chapter 6: Sec. 4 to 6 of[2]

REFERENCE BOOK(S):

1. K.S.Rawat, Trigonometry, Sarup and Sons, New Delhi,2005.

2. S.K.Jain, Fourier Series and Fourier Transforms, Sarup and Sons, New Delhi,2001.

E_RESOURCES :

1. https://www.google.com/url?sa=t&source=web&rct=j&url=http://www.uobabylon.edu.iq/eprints/publication_7_16606_477.pdf&ved=2ahUKEwiEm xwKbtAhX8xzgGHYcXBkEQFjAFegQIChAB&usg=AOvVaw1E_Pm2tIK4fJsAiuQJmwr2

2. https://www.google.com/url?sa=t&source=web&rct=j&url=http://www.iitg.ac.in/physics/fac/charu/courses/ph405/FourierTransform.pdf&ved=2ahUKEwinktHFsaXtAhXQfX0KHaaaAtAQFjAMegQIDxAB&usg=AOvVaw066vJTVNV2fz-BAT4YWaDb

****

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI – 614016.

DEPARTMENT OF MATHEMATICS
ALLIED MATHEMATICS
ALLIED COURSE – IV

(For Physics & Chemistry)

Semester : II – AC – IV : ODE, PDE AND LAPLACE TRANSFORMS

Ins. Hrs. /Week : 4 **Course Credit: 3** **Course Code :20AMM204**

OBJECTIVES :

- **To learn the basic concepts of ODE and PDE.**
- **To train the students in problem solving skills of PDE and Laplace Transforms.**
- **To learn the concept of linear equation with constant coefficient.**

UNIT I

OrdinaryDifferentialEquationoffirstorderbutofhigherdegree–Equationssolvableforx,solvable for dy/dx, Clairaut's form (simple cases only)

UNIT II

Linear equations with constant coefficients – Finding Particular integrals in the cases of e^{kx}, sin(kx),cos(kx) (where k is a constant), x^k where k is a positive integer, and $e^{kx}f(x)$ where f(x) is any function of x (only problems in all the above-No proof needed for any formula).

UNIT III

Formation of Partial differential equations by eliminating constants and by elimination of arbitrary functions – Definition of general, particular & complete solutions – Singular integral (geometrical meaning not required) –Solutions of first order equations in the standard forms - f (p , q) = 0, f (x , p,q)=0,f(y,p,q)=0,f(z,p,q)=0, $f_1(x,p) = f_2(y,q)$, z = xp+yq+f(p,q) - Lagrange's Equations and simple problems.

UNIT IV

Laplace Transform – Definition – L(e^{at}), L(cos at), L (sin at), L(t^n), where n is a positive integer. Basic theorems & formula only - L [e^{-st}cosbt], L [e^{-st}sinbt],L[e^{-st}f(t)]– L[f(t)], L[f'(t)], L[f''(t)].

UNIT V

Inverse Laplace Transforms related to the above standard forms – Solving Second Order ODE with constant co - efficients using Laplace Transforms.

COURSE OUTCOME :

After the completion of the course the students will be able to

1. Learn the order and degree of the ODE's.
2. Identify some specific methods and solve them.
3. Understand the formation of PDE by eliminating constants and arbitrary functions.
4. Learn the Laplace Transforms and its related problems.
5. Understand the Inverse Laplace Transforms and solving second order ODE with constant Co-efficients.

TEXT BOOK(S) :

1.S. Narayanan, T.K. Manicavachagam Pillai, Calculus Volume- III, S.Viswanathan Pvt. Limited,2014.

UNIT–I Chapter – 1 :Sec. : 5,6
UNIT – II Chapter – 2 :Sec. :1to4
UNIT – III Chapter – 4 : Sec. : 1, 2, 3, 5[5.1 to 5.4], 6
UNIT – IV Chapter – 5 : Sec. : 1, 2, 4, 5
UNIT – V Chapter – 5 :Sec. : 6 to 11

REFERENCE BOOK(S):

1. M.L.Khanna, Differential Equation, Jaipra kashnath & Meerut,1994.

2. K.S.Rauat, Differential Equation, Sarup and Sons, New Delhi,2003.

E_RESOURCES :

1. https://www.researchgate.net/publication/267487772_Differential_Equations_and_Their_Applications

2. https://www.google.com/url?sa=t&source=web&rct=j&url=http://www.personal.psu.edu/wxs27/250/NotesLaplace.pdf&ved=2ahUKEwjXmraOw6btAhX0zzgGHeHeD8MQFjABegQIEhAB&usg=AOvVaw1mHmdFf0ghr6_ToFjy7Bzq

****

BHARATHIDASANUNIVERSITY, TIRUCHIRAPPALLI- 620024

ENVIRONMENTAL STUDIES

(Applicable to the candidates admitted from the Academic year 2019-20 onwards)

Unit: 1

The Multidisciplinary nature of environmental studies

Definition, scope and importance. (2 lectures)

Need for public awareness

Unit: 2

Natural Resources: Renewable and non-renewable resources: Natural resources and associated problems.

a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources: Land as a resources, land degradation, man induced Landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles. (8 lectures)

Unit: 3Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession.
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem:-2
- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans,estuaries)

(6 lectures)

Unit: 4 Biodiversity and its conservation

- Introduction – Definition : Genetic, species and ecosystem diversity
- Bio geographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and optionvalues
- Biodiversity at global, National and local levels

- India as a mega-diversitynation
- Hot-spots ofbiodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlifeconflicts.
- Endangered and endemic species ofIndia
- Conservation of biodiversity: In-situ and Ex-situ conservation ofbiodiversity.
- Biological Diversity Act 2002/ BDRules, 2004 (8 lectures)

Unit: 5 Environmental Pollution

Definition

Causes, effects and control measures of :

a. AirPollution

b. WaterPollution

c. SoilPollution

d. MarinePollution

e. Noisepollution

f. ThermalPollution

g. Nuclearhazards

- Solid waste Management: Causes, effects and control measures of urban and industrialwastes.
- Role of an individual in prevention ofpollution
- Pollution casestudies
- Disaster management: floods, earthquake, cyclone andlandslides.
- Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards, Types ofFire, Firework andSafety3 (8 lectures)

Unit: 6 Social Issues and the Environment

- From Unsustainable to Sustainable development.
- Urban problems related toenergy.
- Water conservation, rain water harvesting, watershedmanagement.
- Resettlement and rehabilitation of people; its problems and concerns. Casestudies
- Environmental ethics: Issues and possiblesolutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wastelandreclamation.
- Consumerism and wasteproducts.
- Environment ProtectionAct.
- Air (Prevention and Control of Pollution)Act.
- Water (Prevention and Control of Pollution)Act.
- Wildlife ProtectionAct.
- Forest ConservationAct.
- Issues involved in enforcement of environmental legislation
- Publicawareness. (7 lectures)

Unit: 7 Human Population and the Environment

- Population growth, variation amongnations.
- Population explosion – Family WelfareProgrammes
- Environment and humanhealth
- Human Rights - Value Education
- HIV/ AIDS - Women and ChildWelfare
- Role of Information Technology in Environment and humanhealth
- Casestudies.

Unit: 8 Field Work

- Visit to a local area to document environmental assets-river / forest/ grassland/ hill /mountain

References:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public LtdBikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt ltd, Ahamedabad – 380013, India, E-mail:mapin@icenet.net(R)
3. Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc 480 p
4. Clark R.S. Marine Pollution, Clanderson Press Oxford(TB)
5. Cunningham, W.P.Cooper, T.H.Gorhani E & Hepworth, M.T.2001.
6. De A.K. Environmental Chemistry, Wiley EasternLtd
7. Down to Earth, Centre for Science and Environment(R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford University, Press473p.
9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay(R)
10. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University Press 1140 p.
11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub. House, Delhi284 p.
12. Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions, Webenhanced edition 639 p. 13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications(TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co.(TB)
15. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574p
16. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345p.
17. Sharma B.K. 2001 Environmental chemistry Goel Publ House,Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C. Harper, J and Michael Begon, Essentials of Ecology, Blackwell science(TB)
20. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol.I and II, Enviro Media(R).
21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications(TB).
22. Wagner K.D. 1998 Environmental Management. W.B. Saunders Co. Philadelphia USA 499 p (M) Magazine(R)

23.http://nbaindia.org/uploaded/Biodiversityindia/Legal/33%20Biological%20Diversity%20Rules,%202004.pdf.

****

SEMESTER III

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI –614016

(For the Candidate admitted in the academic year2020-2021)

DEPARTMENT OF PHYSICS

B. Sc., PHYSICS

Semester: III-CC- III: THERMAL PHYSICS

Ins. Hrs. /Week: 6 **Course Credit: 5** **Course Code:20PH305**

OBJECTIVES

- To understand the phenomena connected with heat as radiation,
- To know the basics concept of conduction and production methods
- To understand the converse process of making heat to do mechanical work and the basic laws of Thermo dynamics.

UNIT -I: Specific Heat **(17 Hours)**

Specific heat of solids – radiation correction – Dulong and Petit's law - Quantum theory - Einstein theory of specific heat – Debye's theory of specific heat– Specific heat of liquids – Newton's law cooling - Specific heat of gases – Mayer's Relation .

UNIT- II:Conduction **(19 Hours)**

Coefficient of Thermal Conductivity - Rectilinear Flow of Heat along a Bar - Thermal conductivity of good conductors - Lee's method for metals – Forbe's method to find K – Lee's disc method of Bad Conductors – Heat Flow Through a Compound wall – Accretion of Ice on Ponds –Practical applications of conduction of heat.

UNIT -III:Radiation **(18 Hours)**

Radiation – Stefan's law - Deduction of Newton's law from Stefan's law – Boltzmann's law – Bloc body radiation – Wein's law – Rayleigh-Jean's law -Wiedemann-Franz law– Planck's law Angstrom Pyrheliometer – Solar constant – Surface temperature of sun - Sources of solar energy Photo voltaic cell .

UNIT- IV: Low Temperature **(18 Hours)**

Joule – Thomson's effect – Porous plug experiment – Liquefaction of gases –Linde's method Liguefaction of hydrogen-Adiabatic demagnetization–Liquefaction of He– Practical applications of low temperature – Refrigerating mechanism.

UNIT -V: Thermodynamics **(18 Hours)**

Zeroth law of thermodynamics – First law of thermodynamics – Heat engines – Reversible an irreversible process - Carnot's theorem – Second law of thermodynamics - Thermodynamic Scale temperature – Entropy – Change of entropy in reversible and irreversible processes – Temperature entropy diagram (T.S) – Law of increase of entropy – Maxwell's thermo dynamical relations.

Total Lecture Hours-90

COURSE OUTCOME

The students will be able to

1. Understand the phenomena connected with heat as radiation
2. To know the basics concept of conduction and production methods
3. Ability to different thermal capacities of substances
4. Understandtheconverseprocessofmakingheat to do mechanical work
5. Study the basic laws of Thermodynamics

TEXT BOOK(S)

1. J.B.RajamandC.LArora,1983,Heat and Thermodynamics, S.Chand&Co.
2. Brijlal and Subramaniyam,2015, Heat and Thermodynamics & Statistical physics, S. Chand &Co.
3. Brijlal and Subramaniyam, 2016,Heat and Thermodynamics , S. Chand & Co.
4. Mark Zemansky and Richard Dittman 1 July 2017 , Heat and Thermodynamics, SIE 8thEdition
5. D.S. Mathur , 1 January 2008, Heat and Thermodynamics S. Chand &Sons

REFERENCE BOOK(S)

1. M. Narayanamoorthy and N. Nagarathinam, 1987,Heat, National publishing Co,Eight editionChennai,.
2. D.S. Mathur,2014, Heat and Thermodynamics, S. Chand &Co.
3. Anandamoy Manna, January 2011,Heat and Thermodynamics.
4. S.C. Garg,R.M. Bansal&Ghosh, 1 July 2017, Thermal Physics: with Kinetic Theory, Thermodynamics and Statistical Mechanics 2nd Edition,
5. Erode Gopal, 12 June 2012,Specific Heats at Low Temperatures (The International Cryogenics Monograph Series),

E_RESOURCES

https://youtu.be/1nECy2s_qEo
https://youtu.be/x6V-8rYNuss

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OFPHYSICS

B.Sc.,PHYSICS

Semester: III-CP- III: PHYSICS PRACTICAL- III

Ins. Hrs./Week:3 **CourseCredit:3** **Course Code:20PH306P**

(Any Twelve Experiments)

OBJECTIVES

- **To enhance the knowledge in experimental physics.**

1. Specific heat capacity – Newton's Law of cooling
2. Rigidity modulus – Torsion Pendulum (Without mass)
3. Rigidity modulus – Torsion Pendulum (With mass)
4. Emissitive and Emissive power of a surface.
5. Specific heat capacity of a liquid by method of mixtures (Mass time correction)
6. Young's modulus by non-Uniform bending Optic lever method.
7. Specific heat capacity – Joule's Calorimeter.
8. A Thermal Conductivity – Lee'sdisc.
9. Spectrometer – Liquid Prism.
10. post office Box – Determination of temperature co-efficient.
11. A.C frequency by Sonometer using steel wire.
12. Young's modulus by Non-uniform bending Koenig's method.
13. C frequency by Sonometer using brass wire.
14. Bifilar Pendulum.
15. Sonometer – Determination of specific gravity of solid and liquid.

TEXT BOOK(S)

1. Dr.S.Somasundara *Practical Physics*, Apsara publications, Tiruchirapalli,2012.
2. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli1998.

REFERENCE BOOK(S)

1. S. Srinivasan, *A Text Book of Practical physics*, S. Sultan Chandpublications,2005.
2. R. Sasikumar, *Practical Physics*, PHI Learning Pvt. Ltd, NewDelhi,2011.

E_RESOURCES:

1.https://youtu.be/GTnPEtksTEc

2.https://youtu.be/veQ-LfJhfxM

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS),

SUNDARAKKOTTAI, MANNARGUDI – 614016.

(For the candidates admitted in the academic year 2020 – 2021)

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

ALLIED COMPUTER SCIENCE

ALLIED COURSE-I

Semester: III-AC- I: Introduction to Computer and Office Automation

Ins. Hrs./Week:4 **CourseCredit:4** **Course Code: 20ACS301**

OBJECTIVES

- To train and educate intellectually challenged students to gain provided skills and knowledge to operate computers independently
- To understand the principles of software and hardware operations
- To educate MS-office, Internet operations, online, offline working areas

UNIT- I: Fundamentals of computer **(13 Hours)**

Introduction - Characteristics of Computers - Evolution Of Computers - **Generation of computers**: First Generation-Second Generation-Third Generation-Fourth Generation-Fifth Generation-Types of computers and its features – Applications of computer - Functional Components of a computer.

UNIT –II: Hardware and Software **(12 Hours)**

Block diagram of computer - **Hardware and its Types:** Input and Output devices- Different type of printers - Memory and storage devices-Classification of Storage Device-Characteristics of Storagedevices-Differentportsanditsuses–**Softwareanditsclassification**:Application Software-System Software **- Networks** : LAN- WAN - Client-Server.

UNIT- III:Word Processing **(13 Hours)**

Typing- Editing- Proofing & Reviewing- Formatting Text & Paragraphs Automatic Formatting and Styles - Working with Tables - Tables – Columns – Labels - Plotting, editing and Filling drawing objects Bookmark – Header & Footer - Graphics and Frames - Mail Merge – Formatted output and Report generation Printing Documents-Working with Internet.

UNIT- IV:Excel Spreadsheet **(11 Hours)**

Designing a Work Sheet and Work Books-Working & Editing in Workbooks-Applying Formulas-Compute sums, averages, min, max, percentages - Creating Formats & Links –Apply Conditional Formatting- Formatting a Worksheet & creating graphic objects - Creating Charts (Graphs) - Formatting and analyzing data - Organizing Data in a List Sharing & Importing Data - Printing.

UNIT- V:PowerPointPresentations **(11 Hours)**

Getting started in PowerPoint- Create a new presentation-Modify presentation themes-Add and edit text to slides-Add new slides to a presentation.–Designing slides- Insert clipart images and shapes to slides-Insert and modify tables and charts- Previewing a slide show - Adding picture & graph - Adding sound & video - Adding auto shape – Animating objects.

Total Lecture Hours-60

COURSE OUTCOME

Upon successful completion of this course, students will be able to

1. Understand the basics of computers
2. Create documents using MS Word
3. Work with tables, graphs in MS-Office
4. Gain practical exposure on spreadsheet
5. Operate with MS-office Power point

TEXT BOOK(S):

1. MichaelMiller2010,Absolute Beginner's Guide to Computer Basics,5thEditionPrentice Hall,United States..
2. Ram . B and Sanjay Kumar 2018, Computer Fundamentals: Architecture and Organization, 6thEdition New Age International Publisher, NewDelhi.

REFERENCE BOOK(S):

1. Deborah Hinkle 2003, Microsoft Office 2003 PowerPoint: A Professional Approach, comprehensive w/ Student CD, McGraw-Hill/Irwin- NewDelhi.
2. Nellai Kannan .C 2002, MS-Office, Nels Publications, TamilNadu.
3. Robin Romer.M, Jessica Evans ,Katherine Pinard.T , Rachel Biheller Bunin2010, Microsoft Office 2010: Introductory -1st Edition Published by Cengage Learning,India.

E-RESOURCES:

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

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS),

SUNDARAKKOTTAI, MANNARGUDI – 614016.

(For the candidates admitted in the academic year 2020 – 2021)

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

ALLIED COMPUTER SCIENCE

ALLIED PRACTICAL-I

Semester: III-AP- I: Office Automation Lab

Ins. Hrs./Week:3 **CourseCredit:2** **Course Code:20ACS302P**

OBJECTIVES

- To acquire knowledge on editor, spread sheet, slide preparation
- To improve creative thinking in presentation software
- To familiarize the students in preparation of documents and presentations with office automation tools.

I. MS-WORD

1. TextManipulation:WriteaparagraphaboutyourinstitutionandChangethefont 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.
4. Tables and manipulation: Creation, Insertion, Deletion (Columns and Rows). Create a mark sheet.
5. Mail Merge: Prepare an invitation to invite your friends to your birthday party. Prepare minimum five letters.

II. MS-EXCEL

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

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

COURSE OUTCOME

Upon successful completion of this course, students will be able to

1. Exhibit improved understanding of computer operations
2. Create professional word documents
3. Design the excel spreadsheets
4. Draw charts and graphs
5. Design their own power point presentations

SEMESTER IV

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: IV- CC- IV : ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM

Ins. Hrs./Week:5 **Course Credit: 5** **Course Code:20PH407**

OBJECTIVES

- To Understand The Electrostatics Concept And The Laws Associated With Them
- To acquire knowledge of chemical effects of electric current and concepts of DC circuits
- To study the basics of AC current and concepts of magnetic materials

UNIT-I:Electrostatics (14-Hours)

Coulomb's Law–Gauss's Law and its applications(Electric Field due to a uniformly charged sphere, hollow cylinder& solid cylinder)–Electric Potential–Potential at appoint due to a uniformly charged conducting sphere – Principle of a capacitor– Capacity of a spherical and cylindrical capacitors – Energy stored in a charged capacitor.

UNIT-II :Current Electricity (14-Hours)

Ampere's circuital law and its applications–Theory of Ballistic Galvanometer –Figure of merit– Damping Correction–Kirchhoff's Laws of Electricity–Wheatstone's Bridge–Carey Foster's Bridge–Potentiometer– Calibration of Ammeter – Calibration of Voltmeter (Low range and High range) – Comparison of Resistances-Thomson coefficient.

UNIT- III: Electromagnetic Induction (17-Hours)

Laws of electromagnetic induction– Self and mutual induction– Self-inductance of a solenoid– Mutual inductance of a pair of solenoids–Coefficient of coupling– Experimental determination of self inductance (Rayleigh's method) and mutual inductance– Growth and decay of current in a circuit containing L and R–Growth and decay of charge in a circuit containing C &R

UNIT-IV:AC Circuits (16-Hours)

Alternating EMF applied to series circuits containing LC, LR and CR–Alternating EMF applied to circuits containing L, C and R–Series and Parallel resonance circuits– Sharpness of resonance–Q factor– Comparison between Series and Parallel resonant circuits–Wattless current–Choke Coil– Transformer–Uses of Transformers.

UNIT-V:Magnetism (14-Hours)

Intensity of Magnetization–Magnetic Susceptibility–Magnetic Permeability–Types of magnetic materials–Properties of para, dia and ferromagnetic material– Weiss's theory of ferromagnetism– B-H curve–Energy loss due to magnetic hysteresis – Ballistic Galvanometer method for plotting B-H curve

Total Lecture Hours-75

COURSE OUTCOME

The students will be able to

1. Understand the concepts of Electrostatics and the laws associated with them.
2. Acquire knowledge of current electricity and thermo electricity
3. Understand the growth and decay of charge and current in DC circuits.
4. Understand the basics of AC and Electromagnetic induction
5. understand the concepts of magnetic properties materials

TEXT BOOK(S)

1. BrijLal and N. Subrahmanyam, ,2000*A Text Book of Electricity and Magnetism*, RatanPrakasanMandirEducational&UniversityPublishers,NewDeihi.
2. R. Murugeshan,2015 *Electricity and Magnetism*, S. Chand & Company Pvt. Ltd., New Delhi.
3. NarayanamoorthyM &NagarathnamN,ElectricityandMagnetism,Meerut,NationalPublishingCo., 4 th edition.
4. A.S Mahajan & A A Rangwala , 2007Electricity and Magnetism, Tata McGraw-Hill Publishing Company Limited, NewDelhi.
5. Shobit Mahajan , 2012 Electricity Magnetism and Electromagnetic Theory, Tata McGraw-Hill Publishing Company Limited, NewDelhi.

REFERENCEBOOK(S)

1. D. L. Sehgal, K. L. Chopra and N. K. Sehgal, 1996 *ElectricityandMagnetism*,S. Chand & Sons. New Delhi.
2. Brij Lal, Subramanian N and Jivan Seshan, 2005 Mechanics and Electromagnetics, New Delhi, Eurasia Publishing House Pvt.Ltd.
3. 3.David J Griffith, 1997 Introduction to Electrodynamics, 2 nd Edition, New Delhi,Prentice
4. Hall of India Pvt.Ltd.

E-RESOURCES

1. https://www.allaboutcircuits.com/alternating-current
2. https://www.electronics-tutorials.ws/accircuits/series-circuit.html
3. https://byjus.com/jee/paramagnetic-materials/
4. https://youtu.be/a0SFhIWmuXE
5. https://youtu.be/sP0p6q6mwUc

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: IV-CP- IV: PHYSICS PRACTICAL- **IV**

Ins. Hrs./Week:3 **Course Credit: 3** **Course Code:20PH408P**

(**Any Twelve Experiments)**

OBJECTIVES

- To motivate and educate the students to acquire skill in physics Experiments.

1. Carey Foster's Bridge- Specific Resistance.
2. Carey Foster's Bridge- Temperature coefficient.
3. Potentiometer-Calibration of low range voltmeter.
4. Figure of Merit of a B.G
5. Characteristics of Junction Diode.
6. Characteristics of Zener Diode.
7. Self Inductance of a coil- Anderson bridge.
8. Logic gates – Discrete components.
9. Potentiometer- high range voltmeter.
10. Series resonant circuit.
11. Parallel resonant circuit.
12. Field along the axis of the coil.
13. Moment of magnet – Tan c Position.
14. M and B_H determination.
15. Transistor –Characteristics.

TEXT BOOK(S)

1.Dr.S.Somasundaram, *Practical Physics*, Apsara publications,Tiruchirapalli,2012.

2. Department of Physics, *Practical Physics*, (B.Sc. PhysicsMain),St. Joseph's College, Tiruchirapalli1998.

REFERENCE BOOK(S)

1.S. Srinivasan, *A Text Book of Practical physics*, S. Sultan Chand publications,2005.

2. R. Sasikumar, *Practical Physics*, PHI Learning Pvt. Ltd, New Delhi,2011.

E_RESOURCES

1.https://youtu.be/5Rk2klHiPBc

2.https://youtu.be/N0lxwqANsd4

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS),

SUNDARAKKOTTAI, MANNARGUDI – 614016.

(For the candidates admitted in the academic year 2020 – 2021)

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

ALLIED COMPUTER SCIENCE

ALLIED COURSE – II

Semester-IV-AC-II: Fundamentals Of C Programming

Ins. Hrs./Week:3 **CourseCredit:2** **Course Code:20ACS403**

OBJECTIVES

- To acquire the basic knowledge in C
- To understand strengths of C, which provide the means of writing efficient, maintainable, and portable code
- To obtain the knowledge in C language with the wide variety of examples and applications

UNIT- I: Overview of C **(10 Hours)**

History of C - Importance of C - Basic structure of C programs- Character set - **C Tokens:** Keywords and identifiers - Constants - Variables - Data types - Declaration of variables - Declaration of storage classes-Assigning values to variables-Defining symbolic constants-**Operators and expression:**-Types of Operators -Arithmetic Expressions - Evaluation of expressions – Precedence of arithmetic operators - Type conversions in expressions - Operator precedence and associativity- **Managing input and output operations:** Reading and writing a character-Formatted input and output.

UNIT-II: Decision making and Branching **(9 Hours)**

Simple IF, IF-ELSE, Nesting of IF-ELSE, ELSE-IF ladder, Switch statements - GOTO statements- **Decision making and looping:** WHILE statement - DO statement – FOR statement - Jumps in loops- **Arrays:** Definition &Declaration-One dimensional-Two dimensional-Multidimensional arrays- Dynamic arrays.

UNIT- III: Character arrays and strings **(8 Hours)**

Introduction-Declaring and initializing string variables-Reading strings from terminal-Writing strings to screen-String handling functions-Table of strings-**User Defined functions:** Introduction-Need for user - Defined function - A Multi- function program - Elements of user Defined function - Definition of functions-Return values and their types-Function calls–Function declaration-All category of functions - Nesting of functions - Recursion - Passing arrays to functions - Passing strings to function.

UNIT- IV: Structures and Unions **(9 Hours)**

Introduction - Defining a structure - Declaring structure variables - Accessing structure members – Structure initialization-Copying and comparing structure variables-Arrays of structures-Arrays within structures-Structures within structures-Structures and functions–Unions-Size of structures-Bit fields- **Pointers:** Introduction - Understanding pointers - Accessing the address of a variable - Initializing of pointer variables. Chain of pointers - Pointer expressions -Pointers and arrays Pointers and character strings - Arrays of pointers - Pointers as function arguments - Functions returning pointers - Pointers to functions - Pointer and structures.

UNIT- V: File Management in C **(9 Hours)**

Introduction - Defining and opening a file -Closing a file - Input/ Output operation on files - Error handling during I/O operations - Random access files - Command line arguments- **Dynamic Memory Allocation:** Introduction of Dynamic memory allocation-Memory allocation process-Allocating a block of memory MALLOC-Allocating a multiple blocks of memory CALLOC-Altering the size of a block REALLOC.

Total Lecture Hours-45

COURSE OUTCOME

Upon successful completion of this course, students will be able to

1. Understand the basic terminology used in computer programming
2. Design programs involving decision structures, loops and operators
3. Understand the use of functions in programming and Arrays
4. Understand the dynamics of memory by the use of pointers and Structures
5. Use different data structures and create/update basic data files

TEXT BOOK(S)

1. Balagurusamy E. 2018, Programming in ANSI C, Eighth Edition, McGraw-Hill,New Delhi,India.
2. Deitel.H.M 2010, C:How to program, 7th Edition, Pearson Education, London,England.

REFERENCE BOOK(S)

1. Bichkar.R.S 2012. Programming with C, University mress,Cambridge,England.
2. Herbert Schildt 2017. C, The Complete Reference, Fourth Edition ,McGraw Hill Education, NewDelhi,India.
3. Mike Mcgrath 2018. C Programming in Easy Steps, ,Fifth Edition ,In Easy Steps Limited, Leamington Spa, Warwickshire.

E-RESOURCES

1. https://cutt.ly/pbhDNFx
2. https://www.learnpick.in/prime/documents/ppts/details/42/structures-in-c
3. http://www.d.umn.edu/~rmaclin/cs1622/Chapter09-10/Chapter09-10.PPT

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS),

SUNDARAKKOTTAI, MANNARGUDI – 614016.

(For the candidates admitted in the academic year 2020 – 2021)

PG & RESEARCH DEPARTMENT OF COMPUTER SCIENCE

ALLIED COMPUTER SCIENCE

ALLIED PRACTICAL-II

Semester:IV-AP-II Computer Programming Lab Using C

Ins. Hrs./Week:3 **CourseCredit:2** **Course Code:20ACS404P**

OBJECTIVES

- To write, compile and debug programs in C language
- To formulate problems and implement algorithms in C
- To effectively choose programming components that efficiently solves computing problems in real-world environment

EXERCISES

1. Solution of a Quadratic Equation (all cases)
2. Write a Program to find whether given number is Even or Odd.
3. Sum of Series (sine, cosine,ex)
4. Conversion of Number System (Decimal to Binary, Decimal to Octal)
5. Largest, Smallest among 'n' numbers (Also use it to find the number of occurrences of a given number)
6. Ascending and Descending order of numbers using Arrays.
7. Sorting of names in Alphabetical order
8. Matrix Operations (Addition, Subtraction, Multiplication – use Functions).
9. Finding factorials, generating Fibonacci Numbers using recursive functions.
10. String manipulations without using string functions

(String length, String Comparison, String Concatenation, Palindrome Checking, Counting words and lines in String – use function Pointers).

COURSE OUTCOME

Upon successful completion of this course, students will be able to

1. Understand the basic concept of C Programming and its different modules
2. Acquire knowledge about the basic concept of writing program
3. Understand the role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language
4. Write programs using the concept of Arrays and pointers dealing with memory management
5. Write programs using String operations

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI - 614016.

(For the Candidates admitted in the academic year 2020-2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: IV-SBE - I: FIBER OPTIC COMMUNICATION

Ins. Hrs./Week:2 **CourseCredit:2** **Course Code: 20SBEPH1**

OBJECTIVES

- To learn the basic elements of optical fiber transmission links and various configurations.
- To understand the different kinds of losses, signal distortion and fiber modes
- To learn the various optical sources and fiber optical Sensors.

UNIT-I:Optical Fiber **(6 Hours)**

Introduction – Structure of optical fiber-Total Internal Reflection-Block diagram of optical fiber– Advantages, Disadvantages & Applications of fiber optic communication.

UNIT-II: Optical Fiber Modes **(7 Hours)**

Fiber Modes-Wave Propagation-Single and multimode Fibers-Step and Graded index fiber – Ray transmission theory – Single mode fiber – Cut off wavelength.

UNIT-III: Fiber Losses **(5 Hours)**

Fiber Losses - Scattering, absorption, bending, leaky mode and coupling Losses-Attenuation Coefficient. – Inter modal dispersion.

UNIT-IV: Fiber Optical Sources **(6 Hours)**

LEDs - Laser Diode- PN photo diode – Photo detectors – Response time – Comparison of photo detectors.

UNIT-V: Fiber Optic Sensors **(6 Hours)**

General features, -Fiber Optic Sensors-Sensor for Temperature, displacement and pressure measurement, Intrinsic and extrinsic sensor.

Total Lecture Hours- 30

COURSE OUTCOME

The students will able to,

1. Understand the basic elements of optical fiber transmission links.
2. Study about the fiber modes configurations.
3. Learn the different kinds of losses, signal distortion.
4. Gain the knowledge of various optical sources.
5. Learn about fiber optical Sensors.

TEXT BOOK(S)

1. Gerd Keiser,2008 Optical Fiber Communication- 4thEd. MGH.
2. Djafar K. Mynbaev and Lowell ,Fiber Optical Communication Technology–, L.Scheinner(Pearson).
3. G.Agarwal, 2003,Fiber Optic Communication Systems –3rd Edn.(John Wiley,Singapore,).
4. Rongqing Hui, 2019,Introduction to Fiber Optic Communications –, Academic Press; 1 stedition.
5. Anokh Singh and Chopra A.K.,2013,Principles of Communication Engineering ,S.Chand & Company PVT.Ltd..

REFERENCE BOOK(S)

1. John. Senior, Optical Fiber Communication ,Pearson Education,3rd Impression.
2. Joseph C.Palais Fiber Optic Communication 4th Edition, Pearson Education.
3. Subir Kumar Sarkar, 2007,Optical Fibres and Fibre Optic Communication Systems, S. Chand Limited.
4. D.C.Agarwal, 2010, Fiber Optics Communication,S.Chand.
5. R.K.Puri and V.K.Babbar,Optical Fibres and Fibre Optic Communication Systems, ,S. Chand & CO

E-RESOURCES

1. **https://nptel.ac.in/courses/115/107/115107095/**
2. **https://www.youtube.com/playlist?list=PLq-Gm0yRYwTgr7v3HhdrI_Kcc38369fw**
3. **https://nptel.ac.in/courses/115/102/115102026/**
4. **https://moodle.usth.edu.vn/course/view.php?id=362#section-1**
5. **https://youtu.be/q6_q2IBm93o**

SEMESTER V

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: V-CC-V: OPTICS

Ins. Hrs./Week:5 **Course Credit: 5** **Course Code: 20PH509**

OBJECTIVES

- To understand the aberration of a lens
- To enrich the knowledge of interference & diffraction of a lens
- To know the polarizer & optical instruments

UNIT- I:Geometricaloptics **(14 Hours)**

Spherical aberration - Spherical aberration of a thin and thick lens – Methods of reducing Spherical aberration – Coma – Aplanatic surface – Astigmatism – Curvature of the field – Distortion – Chromatic aberration - Chromatic aberration in a lens.

UNIT-II: Interference **(14 Hours)**

Air wedge – Newton's rings – Haidinger's fringes – Brewster's fringes – Michelson Interferometer and its applications – Rayleigh's Interferometer-Stationary waves in light-Holography – Construction and reconstruction of a hologram– Applications.

UNIT-III:Diffraction **(16 Hours)**

Fresnel's diffraction – Diffraction at a (1) circular aperture (2) Straight edge narrow wire – Fraunhofer diffraction at a single slit – Double slit – Missing orders in a Double slit, Diffraction pattern – Grating (theory)- Resolving power – Rayleigh's criterion of resolution-Resolving power of a Telescope and Grating – Dispersive power and resolving power of a grating.

UNIT-IV: Polarization **(15 Hours)**

Nicol prism – Nicol prism as an analyzer and polarizer – Huygens's explanation of Double refraction in uni axial crystals – Double Image polarizing prisms – Elliptical and Circularly polarized light – Production and detection – Quarter wave and half wave plates .

UNIT-V:Optical Instruments **(16 Hours)**

Microscopes – Simple Microscope (Magnifying glass) – Scanning electron microscope(SEM)-Transmission electron microscope(TEM) – Eyepieces - Huygen's Eyepiece - Ramsden's Eyepiese — Comparison of Eyepieces – Abbe Refractometer.

Total Lecture Hours -75

COURSE OUTCOMES

The students will be able to

- Learn the basics of Geometrical Optics and Lenses
- Study the concepts Interference and its applications
- Acquire Knowledge about Diffraction and its applications
- To Understand the concept of Polarization and its application in analyzing the optical activity
- To Procure the Fundamental knowledge of Optical instrument

TEXT BOOK(S)

1. Dr. N. Subramaniyam, Brijlal and Dr.M.N. Avathanulu, 2012*Optics*,S. Chand &Co. Pvt.Ltd.25 threvised edition , NewDelhi.
2. Krishnapada Ghosh Anandamoy Manna,2007 *Text book of Physical Optics*, McMillan India Ltd, Firstedition.
3. Subramaniam N & Brijlal, 1990,Optics, S. Chand & Co. Pvt. Ltd., NewDelhi.
4. Khanna D R & Gulati H R, 1979,Optics, S. Chand & Co. Pvt. Ltd., New Delhi.
5. Grant R.Fowles,2012,Introduction to Modern physics Dover Publications,2ndedition

REFERENCEBOOK(S)

1. Singh & Agarwal,2002 *Optics and Atomic Physics*, Pragati Prakashan Meerut, Nineth edition.
2. A.B. Gupta, 2006,*Modern Optics*, Books and allied (P) Ltd, Kolkata, Firstedition.
3. Ajoy Ghatak,2009, *Optics*, (TMH), New Delhi, Fourthedition.
4. Arial Lipson, Stephen G.Lipson and Hentry Lipson, 2011,*Optical Physics*, Cambrige, Fourthedition.
5. Schaum's outlines,2011, *Optics*, Tata McGrawHill.

E- RESOURCES

1.https://byjus.com/physics/aberration-of-lens/2.https://www.physicsclassroom.com/class/waves/Interference-of-Waves3.https://byjus.com/physics/polarization-of-light/4.https://youtu.be/ap6hzAwoEol
5.https://youtu.be/BXymve4FwqY

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: V-CC- VI: ATOMIC AND MOLECULAR PHYSICS

Ins. Hrs./Week:5 **Course Credit: 5** **Course Code:20PH510**

OBJECTIVE

- To understand the basic properties of Positive and Cathode rays.
- To understand the evolution of different atomic models and X rays.
- To acquire the knowledge of Photoelectric effect and Laser.

UNIT- I: Cathode and positive ray analysis (10 Hours)

Production and Properties of Cathode rays - Electronic charge - Millikan's oil- drop method - Production and properties of positive rays - Thomson's parabola method-Aston's, and Bainbridge's mass - spectrographs (e/m) – Mass defect and Packing Fraction.

UNIT- II: Atom Model (18 Hours)

Bohr atom model – Critical Potentials - Experimental determination of critical potentials - Franck and Hertz's experiment -Somerfield's Relativistic atom model - Vector atom model - Quantum numbers associated with vector atom model - Pauli's exclusion principle - Electronic configurationofelementsandperiodictable-TheSternandGerlachexperiment-Zeemaneffect - Experimental arrangement for the normal Zeeman effect - Larmor's theorem - Paschen Back Effect – Stark effect.

UNIT-III:X-Rays (15 Hours)

X-rays - production - detection and properties -Bragg's law - Bragg's X-ray spectrometer - Laue's experiment - The Powder crystal method –Rotating crystal method -X-ray spectra - Characteristics and continuous of X-ray spectrum - Moseley's law - Compton effect - Determination of wavelength - Symmetry operations and elements of Symmetry.

UNIT- IV: Photoelectric Effect And Free Electron Theory of Metals (17 Hours)

Free electron theory of metals-Properties of metals-Drude and Lorentz theory-Electrical and thermal conductivities - Wiedemann and Franz law. Photoelectric effect - Lenard's experiment - Richardson and Compton experiment - Experimental investigations on the photoelectric effect - Laws of photoelectric emission - Einstein's photoelectric equation - Photoelectric cells – Photo emissive cell - PhotovoltaiccellPhotoconductive cell - Applications of Photoelectric cells.

UNIT- V:Molecular Physics (15Hours)

Induced absorption - Spontaneous emission - Stimulated emission - Ruby laser - He laser - Semiconductor laser - Properties of laser beam – Applications of LASER in Medicine and Industry - Theory of the pure rotational spectrum of a molecule - Theory of the origin of the vibration - rotation spectrum of a molecule - Theory of ESR.

Total Lecture Hours-75

COURSE OUTCOME

The students will be able to

1. Understand the basic properties of Positive and Cathode rays.
2. Explain the evolution of different atomic models and their merits and limitations.
3. Acquire the knowledge of X rays and their detections.
4. Analyze the Photoelectric effect and free electron theory of metals.
5. Understand the different types of Laser and their applications.

TEXT BOOK(S)

1.R. Murugesan, Kiruthiga Sivaprasath, 2014. Modern Physics, 14th Revised edition, S. Chand &Co Ltd., New Delhi.

2.J.B. Rajam, 2009. Atomic Physics, Revised edition, S. Chand & Co Ltd., New Delhi,.

3.Sehgal, Chopra and Sehgal, Modern physics, Sultan Chand &Sons, New Delhi

4.B.H. Bransden, Charles Jean Joachain, Theodor J Plivier, 2003. Physics of atoms and Molecules, 2 nd edition, Pearson Education Limited,England.

5.G. Aruldhas, P. Rajagopal, 2005. Modern Physics, 6 th edition, PHI Learning PrivateLimited, Delhi

REFERENCEBOOK (S)

1. Arthur Beiser, Shobhit Mahajan, S. RaiChoudhury, 2009. Concepts of Modern Physics,6 th edition ,SIE,.
2. S.N .Ghoshal, 2004. Atomic Physics, Revised edition, S. Chand & Co Ltd., NewDelhi.

E -RESOURCES

1.https://www.askiitians.com/revision-notes/physics/atomic-physics/2.https://nptel.ac.in/courses/115/101/115101003/

3. https://www2.physics.ox.ac.uk/sites/default/files/2011-10-19/atomic_physics_lectures_1_8_09_pdf_pdf_1828.pdf
4. https://bit.ly/31U79bG
5. https://youtu.be/dJKBe5ZHL9c

***

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: V-CC- VII : ELECTRONICS

Ins. Hrs./Week:6 **Course Credit: 5** **Course Code: 20PH511**

OBJECTIVES

- To enable the students to understand all aspects of electronics in a lucid and comprehensive manner.
- To understand the concept of Amplifiers and Oscillators.
- To learn about Boolean Algebra and to understand the function of Operational amplifier.

UNIT -I: Semiconductors and Diodes (16-Hours)

Intrinsic and extrinsic semi -conductors –PN junction diode – Biasing–V-I Characteristics– Rectifiers –Half wave–full wave and Bridge rectifiers–Breakdown mechanisms–Zener diode-characteristics of Zener diode - Zener diode as voltage regulator.

UNIT -II: Bipolar Transistors, Amplifiers and Oscillators (19-Hours)

Bipolar junction transistor – Basic configurations -Relation between α and β – Characteristic curves of transistor – CB, CE mode –DC bias and stabilization – fixed bias – voltage divider bias - Single stage CE amplifier –Power amplifiers – Efficiency of class A,B & C Power amplifier – Concept of Negative feedback - Criterion for oscillations –Hartley oscillator – Colpitt's oscillator.

UNIT- III: Number Systems, Logic Gates and Boolean Algebra (20-Hours)

Introduction to decimal, binary, octal, hexadecimal number systems – Inter conversions– 1's and 2's complements –Logic gates, Symbols and their truth tables – AND, OR, NOT, NAND, NOR, XOR, and XNOR – Universality of NAND and NOR gates.

Boolean algebra – De-Morgan's theorems -Reducing Boolean expressions using Boolean laws – SOP forms of expressions (min terms) – Karnaugh map simplification (Four variables).

UNIT- IV: Combinational and Sequential Digital Systems (18-Hours)

Half and full adders – Half and full subtractor – Decoder(2:4 line) – Encoder(4:2 line)– Multiplexer(4:1 line) – Demultiplexer (1:4 line) - Flip flop – RS –clocked RS – T and D flip flops – JK and master slave flip flops – Counters –Four bit asynchronous ripple counter – Mod-10 counter – – Synchronous counter – Ring counter.

UNIT -V: Operational Amplifier **(17-Hours)**

Operational amplifier - Characteristics – Inverting and Non-inverting amplifier – Voltage follower – Adder, Subtractor, Integrator and Differentiator circuits –Op- amp as Comparator –Filters - low, band pass, high pass filters- A/D conversion – Successive approximation method – D/A conversion – R-2R ladder network.

Total Lecture Hours-90

COURSE OUTCOME

The students will be able to

- Understand the basics of semiconductor device.
- Acquire the knowledge of Bipolar transistors.
- Analyze the Boolean systems.
- Study about the Digital systems.
- Enhance the knowledge of Operational amplifier.

TEXT BOOK(S)

1. Mehta V.K.,2014 *Principles of Electronics*, S. Chand and companyLtd.
2. A.P. Malvino, D.P. Leach, 2011*Digital Principles and Application*, IV Edition,Tata McGraw Hill, NewDelhi.
3. V. Vijayendran, 2004,*Digital Fundamentals*, S.Viswanathan, Printers &Publishers Private Ltd, Chennai.
4.Smarajit Ghosh,Fundametals of Elecrtical and Electronics Engineering, PHI Learning Pvt.Ltd.Secondedition.
5.Ajay Kumar Singh , Electronic Devices and Integrated Circuits, PHI Learning Pvt.Ltd.Second edition.

REFERENCE BOOK(S)

1. Theraja. B.L,*2002, Basic electronics - Solid State*, S.Chand and CompanyLtd.

2. Sedha R.S.,2002, *A text book of applied Electronics*, S.Chand & companyLtd.

3. W.H.Gothmann, 1996,*Digital Electronics*, Prentice Hall of India, Pvt. Ltd., NewDelhi.

E-RESOURCES

1.https://youtu.be/G0iSEDyJKDo

2.https://youtu.be/AcxDiesy-nI

3. https://youtu.be/KiiA6WTCQn0

4. https://youtu.be/FKvnmxte98A

5.https://youtu.be/D6-ikJFUoFc

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: V-CP- V: PHYSICS PRACTICAL-V

Ins. Hrs./Week:3 **Course Credit:3** **Course Code:20PH512P**

(Any Twelve Experiments)

OBJECTIVES

- To promote scientific temper and to learn physical concepts through these experiments.

1. Spectrometer- i-d curve.
2. Spectrometer - i-i 'curve.
3. Spectrometer - small angle prism.
4. Spectrometer - Grating-minimum deviation method.
5. Spectrometer – Grating – dispersive power.
6. Spectrometer - Cauchy's constants.
7. Koenig's method – Uniform bending.
8. Field along the axis of a coil – determination of M.
9. Regulated power supply using Zener diode - Percentage of regulation.
10. Single stage - RC coupled amplifier –Transistor.
11. FET Characteristics.
12. FET amplifier – Common source.
13. AND, OR and NOT gates using IC's.
14. Op - Amp -Adder and Subtractor.
15. Op - Amp - Integrator and Differentiator.

TEXT BOOK(S)

1. Dr. S. Somasundaram, 2012, *Practical Physics*, Apsara publications,Tiruchirapalli.

REFERENCE BOOK(S)

1. S. Srinivasan, 2005,*A Text Book of Practical physics*, S. Sultan Chandpublications.
2. 2. R. Sasikumar, 2011,*Practical Physics*, PHI Learning Pvt. Ltd, NewDelhi.

E-RESOURCES

1.https://youtu.be/jNQtYDPslXg

2. https://youtu.be/Q-mhFTe8-Po

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI –614016

(For the Candidate admitted in the academic year2020-2021)

DEPARTMENT OF PHYSICS

B. Sc., PHYSICS

Semester: V - MBE - I: MATERIAL SCIENCE

Ins. Hrs./Week:5 **Course Credit:5** **Course Code:20MBEPH1**

OBJECTIVES

- To understand the basics of crystal structure.
- To develop knowledge in material science and to understand the relationship between properties and material characteristics.
- Acquire knowledge on different types of nonlinear materials & different applications of ceramics.

UNIT- I: Crystal Structure **(19 Hours)**

Types of crystals-space lattice-basis- unit cell and lattice parameters – Bravais lattices-Lattice planes and Miller indices-inter planar spacing in a cubic lattice - SC – BCC – FCC- Sodium chloride and Diamond crystal structure.

UNIT- II: Chemical Bonds **(17 Hours)**

Review of Atomic structure – Inter atomic Forces – Different types of chemical bonds – Ionic covalent bond – Metallic bond – Dispersion bond –Dipole bond – Hydrogen bond.

UNIT - III: Superconducting Materials **(14 Hours)**

Superconductivity – Properties-Meissner's effect- London equations - types of superconductors Type I and Type II –High temperature superconductors Josephson effects and its applications – SQUIDS - Applications of superconductor.

UNIT - IV: Smart Materials **(12 Hours)**

Metallic glass and its applications — Fiber reinforced metals – SAW Materials and its applications – Biomaterials – Ceramic-Nuclear engineering materials-Nano phase materials - SMART materials-Conducting Polymers.

UNIT V: Mechanical behavior of Materials (13 Hours)

Different mechanical properties of engineering materials – creep – Fracture technological properties – factors affecting mechanical properties of Material-Heat treatment-cold and hot working-types of mechanical tests- metal forming process- deformation of Metals.

Total Lecture Hours-75

COURSE OUTCOME

The students will be able to,

1.The lattice vibration and thermal properties
2.Understand the structure of atoms.
3.To understand the properties of Superconducting materials.
4.To acquire knowledge in nano phase materials.
5.Understand the properties of polymers

TEXT BOOK(S)

1.Dr. M.N. Avadhanulu,2016, Material science, S.Chand & Company, New Delhi.

2.C.Kittel ,2004, Introduction to Solid State Physics (Wiley Eastern , New Delhi

3.Donglu Shi , 1995,High – Temperature Superconducting Materials Science and Engineering , Pergamon Publisher.

4.R.S. Khumi , 1987,Material science, S.Chand Publishing .

5.I.P Singh , 2018,Materials Science and Engineering ,Jain Brothers,13th ed..

REFERENCE BOOK(S)

1. M.Arumugam, 1990,Material science, Anuradhapuplishers.
2. V. Raghavan,2019, Material Science and Engineering , Printice HallIndia.
3. V. Rajendran, 2001,Material Science, Tata McGraw Hill Ltd, NewDelhi.
4. William D.Callister, Dravid G. Rethwisch, Steven Bananiaris 2020, Material Scienceand Engineering.

E- RESOURCES

1. https://bit.ly/2Rid7kF
2. https://bit.ly/3dKj6Ga

****

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI - 614016.

(For the Candidates admitted in the academic year 2020-2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: V - SBE - II: SATELLITE COMMUNICATION

Ins. Hrs./Week:2 **Course Credit:2** **Course Code:20SBEPH2**

OBJECTIVES

- To enable the students to become familiar with satellites and satellites services.
- To understand the concept of Power and Antenna Systems.
- To learn about the role of Transponders in Satellite Communication.

UNIT-I:SatelliteCommunication **(6 Hours)**

Introduction - Basic components of Satellite – Classification of Satellites – Types of Satellites– Constructional features of Satellites - Applications of satellite communication.

UNIT-II: Earth Orbit Satellite **(6 Hours)**

Kepler's laws, Newton's law – Orbital parameters – Geo stationary and Non-Geo Stationary orbits - Geo synchronous earth orbit satellites - Medium and low earth orbit satellites - Orbital slots.

UNIT-III: Satellite Launching And Subsystems **(5 Hours)**

Launching of Satellites -Satellite Launch Vehicles-Space and earth segment subsystems –Payload and supporting subsystems – Tracking and commands.

UNIT-IV: Antenna Systems And Transponders **(6 Hours)**

Power Systems - Antenna Subsystems - Satellite antennas – Interference analysis - Satellite and Transponders-Block diagram of Transponder-Types of Transponders

UNIT-V: Satellite Applications **(7Hours)**

INSAT - VSAT- GSM – GPS – INMARSAT -Satellite Navigational System, Direct broadcast Satellites (DBS/DTH).

Total Lecture Hours- 30

COURSE OUTCOME

The students will able to,

1. Make the students to become familiar with satellites and satellites services.
2. Study about satellite orbits and Launching.
3. Study the concept of Earth segment and space segment components**.**
4. Understand the concept of Power and Antenna Systems.
5. Learn about the role of Transponders in Satellite Communication.

TEXT BOOK(S)

1.T. Pratt, Ch. Bostain, J.Allnutt, 1986,Optical Satellite Communications, 2 nd edition,John Wiley & Sons

2. I.Poornima Thangam , 2012,Satellite Communication, CharulathaPublications.

3. A.W. Joshi,2000, Horizons of Physics (Wiley Eastern Ltd, NewDelhi).

4.U.Shankar,2007, The Economics of India's Space Programme – An Exploratory Analysis 2nd reprint, Oxford University Press, Delhi.

5. R. Blake, 2001,Wireless Communication Technology DELMAR, New Delhi.

REFERENCE BOOK(S)

1. D.Roddy, 2001,Satellite Communications, 3 rd ed., McGraw–Hill.
2. B.Elbert, 1999,Introduction to Satellite Communications, 2 nd ed., ArtechHouse.
3. Dr.D.C.Agarwall,1995 "Satellite Communications", Khanna Publications, 3rdedition.
4. G.D. Gordon and W.L. Morgan, *Principles of Communication Satellites*, John Wiley & Sons,Inc
5. Anil K. Maini, Varsha Agrawal, Satellite Communications, Wiley India Pvt.Ltd.,

E - RESOURCES:

1. **http://nptel.iitm.ac.in/course.php**
2. **http://ocw.mit.edu**
3. **www.radio-electronics.com**
4. **http://en.wikipedia.org**
5. **https://youtu.be/f2wlHL1Sok8**

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI - 614016.

(For the Candidates admitted in the academic year 2020-2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: V - SBE - III: MOBILE COMMUNICATION

Ins. Hrs./Week:2 **CourseCredit:2** **Course Code: 20SBEPH3**

OBJECTIVES

- Expose the students to understand the mobile radio communication principles.
- To learn the basic terms in mobile telephony concepts.
- To understand the various multiple access techniques and wireless standards.

.

UNIT-I:Mobile Communication **(5 Hours)**

Mobile Communication-Mobile services-Features of mobile Communication- Concept of cell – Advantages of mobile communication.

UNI-II: Terms In Mobile Telephony **(6 Hours)**

Mobile station(MS) – Mobile Equipment (ME) – SIM – Base station(BS) – Base Transceiver Station(BTS) – MSC –Channels – Hand off – Dropped call.

UNIT-III: Multiple Access Techniques **(6 Hours)**

FDMA, TDMA, CDMA, SDMA Techniques – Spread Spectrum multiple access – FHSS,DSSS

UNIT-IV:Cellular Concept **(7 Hours)**

Cellular telephone specifications and operations – Security and Privacy - Cell site equipment-Fax and data communication using cellular phones.

UNIT-V: Mobile Transport And Applications **(6 Hours)**

Mobile TCP – WAP – Architecture – WDP –WTLS –WTP-WSP – WAE –WTA Architecture– WML.

Total Lecture Hours- 30

COURSE OUTCOME

The students will able to,

1. Understand the mobile radio communication principles.
2. Learn the basic terms in mobile telephony concepts.
3. Understand the various multiple access techniques.
4. Study the Recent trends adopted in cellular systems and wireless standards.
5. Know about the concept of mobile antennas.

TEXT BOOK(S)

1. Williams, C.Y. Lee, 1991,Mobile cellular telecommunications second edition by: Tata McGraw – Hill Publications.
2. R. Blake,2001, *Wireless Communication Technology* (DELMAR, NewDelhi).
3. Dennis Roddy and John coolen,1990, Electronic communication,PHI.
4. Anokh Singh and Chopra A.K ,2013, Principles of Communication Engineering , S.Chand & Company PVT.Ltd.
5. T.S.Rappaport, 2002,Wireless communications Principles and Practce, 2nd edition,PHI.

REFERENCE BOOK(S)

1.. J.Schiller,2000, Mobile Communication , Addison Wesley.

2. William Stallings, 2003,Wireless Communication and Networks, PearsonEducation.

3. Singhal, WAP2003,Wireless Application Protocol, PearsonEducation.

4. Jochen Schiller,2007 “Mobile Communications”, Second Edition, PearsonEducation.

5. Asoke K Talukder, Hasan Ahmed, Roopa Yavagal,2010 “MobileComputing”,TMH.

E- RESOURCES

1.**https://bit.ly/2JxKvjg**2.**https://www.tutorialspoint.com/mobile_computing/index.htm 2**

3. https://www.javatpoint.com/mobile-computing3

4. https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs13/

5. https://youtu.be/r-RxGQuZLio

BHARATHIDASANUNIVERSITY, TIRUCHIRAPPALLI -24.
UNDER GRADUATE DEGREE PROGRAMMES
SOFT SKILLS DEVELOPMENT

OBJECTIVES

Today's world is all about relationship, communication and presenting oneself, one's ideas and the company in the most positive and impactful way. This course intends to enable students to achieve excellence in both personal and professional life.

UNIT - I

Know Thyself/ Understanding Self

Introduction to Soft skills-Self discovery-Developing positive attitude-Improving perceptions-Forming values

UNIT - II

Interpersonal Skills/ Understanding Others

Developing interpersonal relationship-Team building-group dynamics-Net working Improved work relationship

UNIT -III

Communication Skills / Communication with others

Art of listening-Art of reading-Art of speaking-Art of writing-Art of writing e-mails-e mail etiquette

UNIT -IV

Corporate Skills / Working with Others

Developing body language-Practicing etiquette and mannerism-Time management Stress management

UNIT -V

Selling Self / Job Hunting

Writing resume/cv-interview skills-Group discussion- Mock interview-Mock GD – Goal setting - Career planning

TEXT BOOKS:

1. Meena.K and V.Ayothi (2013) A Book on Development of Soft Skills (Soft Skills : A Road Map to Success), P.R. Publishers & Distributors, No, B-20 & 21,V.M.M.
2. Complex, Chatiram Bus Stand, Tiruchirappalli- 620002.
3. (Phone No: 0431-2702824: Mobile No: 94433 70597, 98430 74472)
4. Alex K. (2012) Soft Skills – Know Yourself & Know the World, S.Chand & Company LTD, Ram Nagar, New Delhi- 110 055. Mobile No : 94425 14814 (Dr.K.Alex)

REFERENCE BOOKS:

1. Developing the leader within you John cMaxwell
2. Good to Great by *JimCollins*
3. The seven habits of highly effective people StephenCovey
4. Emotional Intelligence DanielGoleman
5. You can win ShiveKhera
6. Principle centred leadership StephenCovey

SEMESTER VI

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI –614016

(For the Candidate admitted in the academic year2020-2021)

DEPARTMENT OF PHYSICS

B. Sc., PHYSICS

Semester: VI – CC - VIII: NUCLEAR PHYSICS

Ins. Hrs. /Week:6 **Course Credit:5** **Course Code: 20PH613**

OBJECTIVES

- Understand the basic properties of nuclei and different nuclear models.
- Acquiring the knowledge of different accelerators and their advantages and their limitations.
- To emphasize the understanding of nuclear Accelerators and for producing fission and fusion energy.

UNIT - I: Properties of Nuclei **(19 Hours)**

Constituents of nuclei-Classification of nuclei - Nuclear mass and binding energy - Binding energy and stability of nucleus, Mass defect and Packing fraction, Binding fraction Vs Mass number curve - Nuclear size – Nuclear spin-nuclear energy levels - Nuclear magnetic moment --Parity of nuclei - Nuclear forces - Yukawa's model of nuclear force.

UNIT - II: Radioactivity **(18 Hours)**

Radioactive decay law-Half life and Average life - Activity or strength of a radio – sample - Successive transformation - Radioactive chain- Radioactive equilibrium - Radioactive dating - α-decay - Geiger- Nuttal law , Tunnel effect - Gamow's theory of α decay - β-decay - Energetics of β-decay -Continuous spectrum - Inverse β-decay -Parity violation in β-decay -Neutrino hypothesis - Properties of neutrino - Gamma rays-origin of the gamma rays - Internal conversion.

UNIT - III: Particle accelerators and detectors **(18 Hours)**

Linear accelerator – Cyclotron – Betatron - Electron synchrotron -Accelerators in India.
Radiation Detectors - Ionization Chamber - Proportional counter – G.M. Counter-Cloud chamber - Scintillation counter - Solid state track detector –Semiconductor detector.

UNIT - IV: Nuclear reactions and Reactors **(18 Hours)**

Nuclear reactions - Types of nuclear reactions – Conservation laws in nuclear reactions -Energetic of nuclear reactions - Kinematics of nuclear reactions -Threshold energy of nuclear reactions - Solution of the Q- value equation - Cross-section of nuclear reactions.
Nuclear fission - fission of light nuclei - Nuclear chain reaction - Fusion-Thermonuclear reaction - Hydrogen bomb -Possibility of fusion reactor.

UNIT V: Elementary Particles **(17 Hours)**

Classification of elementary particles – Pions and Muons - K-mesons –Hyperons- Conservation laws - Exact laws - Approximate conservative laws-Fundamental interactions – Antiparticles -Resonance particles – Hyper nucleus- Symmetry classification of elementary particles - Quark model.

Total Lecture Hours-90

COURSE OUTCOME

The students will be able to

1.Understand the evolution of different atomic models and their merits and limitations.

2.Acquire the knowledge of various nuclear decays and radioactivity.

3.Analyze the properties of various fundamental particles, their decay modes and the interactions.

4.Know the different type of nuclear reactions.

5.Understand symmetry properties & Quark model of elementary particles.

TEXT BOOK(S)

1.Gupta & Roy., 2011,*Physics of the Nucleus*, Books and Allied (P) Ltd. Kolkata.

2.Amirtanshu Shukla , 2020,Suresh Kumar Patra.

3.Devanarayanan Shankara ,2016, A Text Book of Nuclear Physics ,Create Space Independent Publ..

4. B.L Cohen, 1988,Concepts of Nuclear Physics (Tata McGraw Hill, New Delhi).

5. David J.Griffiths, 1987,Introduction to Elementary Particles ,Wiley.com.

REFERENCE BOOK(S)

1. S. N. Ghoshal 2003,,*Nuclear Physics* , S. Chand & Co., Edition .

2. M L Pandya& R. P .S .Yadav,2000, *Elements of Nuclear Physics*,Kedaar Nath &Ram Nath.

3. SatyaPrakash,*2011, Nuclear Physics*, A Pragati PrakasanPublication.

4. Jahan Singh, 2012,*Fundamentals of Nuclear Physics*, A PragatiPublication.

5. D.C.Tayal, 2009 ,*Nuclear Physics*, Himalaya PublishingHouse.

E- RESOURCES

1.https://nptel.ac.in/courses/115/104/115104043/

2. https://nptel.ac.in/courses/115/103/115103101/

3.https://www.youtube.com/watch?v=xrk7Mt2fx6Y4.https://bit.ly/2Q3CcPk

5.https://bit.ly/3fNJ52c

6.https://bit.ly/3wxy0Z9

****

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: VI-CC- IX: THEORETICAL PHYSICS

Ins. Hrs./Week:6 **Course Credit:5** **Course Code:20PH614**

OBJECTIVES

- To understand the fundamental principles of classical mechanics.
- To learn and apply the concepts of wave mechanics.
- To understand the basic principles of Quantum mechanics.

UNIT -I: Lagrangian Formulation (19 hours)

Mechanics of aparticleandsystemofparticles–Conservationlaws–Constraints–Generalized coordinates – Principle of virtual work- D' Alembert's principle and Lagrange's equation – Hamilton's principle – Compound Pendulum–Atwood's machine – Simple pendulum.

UNIT- II: Hamilton's Formulation (17 hours)

Hamilton's canonical equations of motion – Hamilton's equations from variational principle – Principle of least action – Phase space – Generalized momentum – Cyclic co-ordinates – Conservation theorem for generalized momentum – Conservation theorem for energy

UNIT -III: Dual Nature of Matter (20 hours)

De Broglie concept of matter waves – De Broglie wavelength – Wave velocity and group velocity for the De Broglie waves – Experimental study of matter waves – Davison and Germer experiment – G.P. Thomson's experiment for verifying De Broglie relation – Heisenberg's uncertainty Principle – Electron microscope – Gamma ray microscope.

UNIT- IV: Basics of Quantum Mechanics (19 hours)

Basic postulates of wave Mechanics – Development of Schrödinger wave equation – Time independent and dependent forms of equations – Properties of wave function – Orthogonal and normalized wave function Eigen function and eigen values–Expectation values and Ehrenfest's theorem.

UNIT- V : Quantum Systems (15 hours)

Linear harmonic oscillator – Particle in a box – Rectangular barrier potential –Rigid rotator – Hydrogen atom.

Total Lecture hours-90

COURSE OUTCOMES

The students will be able to

1. Understand the fundamental principles of classical mechanics.
2. Understand the Hamilton's formulation.
3. Learn and apply the concepts of wave mechanics.
4. Understand the basic principles of Quantum mechanics.
5. Study the applications of Quantum mechanics.

TEXT BOOK (S)

1. Murughesan, R.2016. Modern Physics,18 th edition, S.Chand& Co., NewDelhi,
2. S.L.Gupta., V. Kumar and H.V.Sharma, 2011. Classical Mechanics, 25th edition,Pragathi Prakasan, Educational Publisher,Meerut.
3. H.Goldstein, 2011. Classical Mechanics, 3rd edition, Narosa Book distributors, NewDelhi
4. Sathya prakash, 2007, Quantum Mechanics, PragathiPrakashan,.
5. P M. Mathews and K. Venkatesan, 1987. A Text Book of Quantum Mechanics, TataMc Graw Hill, NewDelhi.

REFERENCEBOOK (S)

1. Arthur Beiser, 1999.Concept of Modern Physics, McGraw HillEd..
2. N.C.Rana and P.S.Joag, 1991. Classical Mechanics, Tata Mc Graw Hill, NewDelhi.

E RESOURCES

1. https://www.youtube.com/playlist?list=PLbMVogVj5nJTDMhThY9xu2Tvg0u1RPuxO
2. https://medium.com/predict/what-is-quantum-mechanics-what-is-theory-of-relativity-Fdbe87eb9c79
3. https://www.askiitians.com/revision-notes/physics/special-theory-of-relativity/
4. https://bit.ly/3cVTXtd
5. https://youtu.be/0FBZFhwJgp8

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: VI-CP- VI: PHYSICS PRACTICAL -VI

Ins. Hrs./Week:5 **Course Credit:3** **Course Code:20PH615P**

(Any Twelve Experiments)

OBJECTIVES

- To provide an in-depth knowledge and skill in Electronics and Micro Processor.

SECTION –A (Electronics):

1. Verification of Boolean Laws (any four).
2. NAND as universal gate.
3. NOR as universal gate.
4. Emitter follower amplifier – Frequency response.
5. Construction of Half wave rectifier.
6. Half Adder and Full adder circuits using logic gates.
7. Half Subtractor and Full Subtractor circuits using logic gates.
8. Flip Flop using gates.

SECTION – B (Microprocessor 8085):

1. 8-bit addition and 8-bitsubtraction.
2. 8-bitmultiplication
3. 8-bit division.
4. Arranging the given set of numbers in ascending order.
5. Arranging the given set of numbers in descending order.
6. Conversion from decimal to hexa decimal system.
7. Conversion from hexadecimal to decimal system.

TEXT BOOK(S)

1. Dr.S.Somasundaram ,2012, *Practical Physics,* Apsara publications, Tiruchirapalli .

REFERENCE BOOK(S)

1. S.Srinivasan 2005,*A Text Book of Practical physics,* S.Sultan Chandpublications.

2. R. Sasikumar,2011, *Practical Physics,* PHI Learning Pvt. Ltd, NewDelhi.

E-RESOURCES

1. https://cutt.ly/UvKpd48

2.https://cutt.ly/NvKpDnB

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF PHYSICS

B.Sc., PHYSICS

Semester: VI-MBE-II: MICROPROCESSOR AND 'C' PROGRAMMING

Ins.Hrs./Week:6 **Course Credit:5** **Course Code:20SBEPH2**

OBJECTIVES

- To introduce students about the features digital computer.
- To learn about 8085 Microprocessor assembly and language Programme.
- To know the C Language &Preliminaries and Functions.

UNIT- I : Basics of Digital Computer **(16-Hours)**

Basic components of a digital computer - Evolution of microprocessors -Important INTEL microprocessors - Hardware, Software and Firmware - Memory - Semiconductor memories - RAM, ROM - Flash memory – CCD memory – Cache memory -Buses.

UNIT- II : Intel 8085 and its Architecture **(17-Hours)**

INTEL 8085 - Pin Diagram - Architecture - Various registers - Status Flags - Interrupts and their order of priority-Addressing modes – Direct Register, Register indirect, Immediate and implicit addressing-Instruction set-Data transfer group-Arithmetic Group - Logical group - Branch group, Stack, I/O and Machine control group.

UNIT- III : Assembly Language Programming **(18-Hours)**

Addition-subtraction-multiplication-division of two 8-bit numbers-Finding the largest and smallest number in a data array-Arranging a list of numbers in ascending or descending order-multibyte addition and subtraction –decimal addition - subtraction.

UNIT- IV:Introduction To C **(20-Hours)**

Basic Structure of C Programs – Character set – C tokens - Keywords and identifiers – constants – variables – Data types – declaration of variables – Assigning values to variables – Symbolic constants – Operators and Expressions – Arithmetic operators-Relational, Logical and Assignment operators, Increment and Decrement operators – Conditional operator, Bitwise and Special operators.

UNIT- V: Preliminaries And Functions (19-Hours)

Data input and output – get char, put char, scan f, print f, gets, puts functions – Decision making and branching –if, if…else, else if ladder, switch, break, continue, goto – Decisionmakingandlooping–while,do…while,for,nestedloops–Arrays(one-,two- dimensional arrays)-Declaration, Initialization of arrays.

Total Lecture Hour-90

COURSE OUTCOME

The students will be able to

1. Know the Basics of Digital Computer.
2. Enrich the knowledge of Intel 8085 and its Architecture.
3. Know the assembly language program
4. Enhance the knowledge the C language.
5. Understand the Preliminaries and Functions.

TEXTBOOK(S)

1. B. Ram ,2013,*Fundamentals of Microprocessors and Microcontrollers*–Dhanpat Rai Publications (P) Ltd., NewDelhi.
2. E. Balagurusamy ,2012, *Programming in ANSI C* – Tata McGraw Hill Education Private Limited, NewDelhi.
3. Tim Bailey ,2000, Inroduction to the C Programming Language and software Design,Prentice – Hall, 2nd edition
4. Arock, , 2014,Fundamentals of Programming With C,Tbh/YesDeePublication.
5. Manish Kumar Ghodki,2000,Fundamentls of Microprocessor Programming,Khanna book publication,Bhopal.

REFERENCE BOOK(S)

1. R.S.Gaonkar,*2007,Microprocessor Architecture,Programming,andApplications with the 8085,* Penram International Publishing (India) Private Limited,Mumbai.
2. K. R. Venugopal and S. R. Prasad 2002,*Programming with C* – Tata McGraw-Hill Publishing Company Limited, NewDelhi.

E_RESOURCES

1. hManishKuarttps://youtu.be/XEMyFUuV310
2. https://youtu.be/1Ei5gBBE4AA
3. https://youtu.be/si-KFFOW2gw
4. https://youtu.be/zAXAb-ttazY
5. https://youtu.be/l78iyzXQrP4

Bharathidasan University, Tiruchirappalli – 24

Gender Studies

Objectives

To make boys and girls aware of each others strengths and Weakness.
To develop sensitivity towards both genders in order to lead an ethically enriched life.
To promote attitudinal change towards a gender balanced ambience and women empowerment .

Unit – I

Concepts of Gender: Sex – Gender – Biological Determinism – Patriarchy – Feminism – Gender Discrimination – Gender Division of labour – Gender Stereotyping – Gender Sensitivity – Gender Equity – Equality – Gender Mainstreaming - Empowerment.

Unit – II

Women's Studies vs Gender Studies : UGC's Guidelines – VII to XI Plans – Gender Studies : Beijing Conference and CEDAW – Exclusiveness and Inclusiveness.

Unit – III

Areas of Gender Discrimination : Family – Sex Ratio – Literacy – Health – Governance – ReligionWorkVsEmployment–Market–Media–Politics–Law–DomesticViolence–Sexual Harassment – State Policies and Planning.

Unit – IV

Women Development and Gender Empowerment : Initiatives – International Women's Decade – International Women's Year – National Policy for Empowerment of Women – Women Empowerment Year 2001 – Mainstreaming Global Policies .

Unit – V

Women's Movements and Safeguarding Mechanism : In India National /State Commission for Women(NCW) – All Women Police Station – Family Court – Domestic Violence Act – Prevention of Sexual Harassment at Work Place Supreme Court Guidelines – Maternity Benefit Act – PNDT Act – Hindu Succession Act 2005 – Eve Teasing Prevention Act – Self Help Groups – 73rd and 74th Amendment for PRIS

References

1. Bhasin Kamala, Understanding Gender : Gender Basics , New Delhi : Women Unlimited , 2004
2. BhasinKamala,ExploringMasculinity:GenderBasics,NewDelhi:WomenUnlimited,2004
3. Bhasin Kamala , What is Patriarchy? : Gender Basics, New Delhi :Women Unlimited,1993
4. Pernau Margrit, Ahmad Imtiaz, Reifeld Hermut (ed.,)Family and Gender : Changing Values in Germany and India ,New Delhi :SagePublications,2003
5. Agarwal Bina, Humphries Jane and Robeyns Ingrid(ed.,) Capabilities , Freedom , and Equality: Amartya Sen's Work from a Gender Perspective,New Delhi : Oxford University Press,2006
6. Rajadurai. S.V,Geetha.V,Themes in Caste Gender and Religion, Tiruchirappalli : Bharathidasan University,2007
7. Misra Geetanjali, Chandiramani Radhika (ed.,) Sexuality , Gender and Rights: Exploring Theory and Practice in South and Southeast Asia, New Delhi : Sage Publication,2005
8. Rao Anupama (ed.,) Gender &Caste : Issues in Contemporary Indian Feminism, New Delhi : Kali for Women,2003
9. Saha Chandana , Gender Equity and Gender Equality : Study of Girl Child in Rajasthan , Jaipur: Rawat Publication,2003.
10. Krishna Sumi, (ed.,),Livelihood and Gender : Equity in Community Resource Management, New Delhi : Sage Publication,2004
11. Pludi.AMichele(ed.,)praegerGuidetothePsychologyofGender,London:PraegerPublisher ,2004
12. Wharton .S Amy , The Sociology of Gender : An Introduction to Theory and Research ,USA : Blackwell Publishing ,2005
13. MohantyManoranjan(ed.,)Class,Caste,Gender:ReadingsinIndianGovernmentandPolitics – 5,New Delhi : Sage Publications ,2004.
14. Arya Sadhna Women ,Gender Equality and the State ,New Delhi :Deep &Deep Publication, 2000
16. Mishra .O.P,Law Relating to Women &Child ,Allahabad :Central Law Agency,2001
17. Chari Leelavathi ,Know Your Rights ,Madras; Tamilnadu Social WelfareBoard,1987
18. Bhattacharya Malini , Sexual Violence and Law ,Kolkata; West Bengala Commission for Women ,2002
19. Sexual Harassment at the Workplace – A Guide , New Delhi;Sakshi,1999

******

IB.Sc.,MATHEMATICS - ALLIED PHYSICS

II B.Sc., COMPUTERSCIENCE - APPLIEDPHYSICS

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI - 614016.

DEPARTMENT OF PHYSICS

For the Students of I B.Sc., Mathematics / II B.Sc., Chemistry

---

Semester: I - AC- I: ALLIED PHYSICS-I

Ins. Hrs./Week:4 **Course Credit:3** **Course Code: 20APY101**

OBJECTIVES:

- To know the basic principles of properties of matter.
- To enable the students to understand the basic concepts of mechanics.
- To understand the basic concepts of heat and temperature.
- To gain the knowledge of phenomenon of light
- To understand the principles of semiconductor diodes, transistors and their characteristics.

UNIT I PROPERTIES OF MATTER

Elasticity: Stress–Strain–Young's modulus–stress-strain Diagram–Bending of beams–Expression for the bending moment–Measurement of Young's modulus by bending of a beam–Non-uniform bending and uniform bending.

Viscosity: Streamline flow and Turbulent Flow-Critical velocity-Poiseuille's formula – Determination of Coefficient of Viscosity of a liquid (Variable Pressure head)

Surface Tension: Drop Weight method of determining the surface tension of a Liquid-Experiment to determine the interfacial tension.

UNITII MECHANICS

Centre of Gravity –Centre of Gravity of a Solid Hemisphere-Hollow Hemisphere-Centre of Gravity of a Solid Cone-Centre of Gravity of a Solid tetrahedron.

States of Equilibrium: Equilibrium of a rigid body – Stable, unstable and neutral equilibrium – Example. Stability of Floating bodies –Meta Center- Determination of Meta centric of a ship.

UNITIII THERMAL PHYSICS

Modes of heat Transfer-Coefficient of Thermal Conductivity-Determination of Thermal Conductivity of a bad Conductor by Lee's disc Method.

Radiation: Blackbody-Stefan's Law-Newton's law of Cooling-Newton's law of cooling from Stefan's Law-Wien's displacement Law-Rayleigh-Jeans Law-Planck's law.

UNITIV OPTICS

Interference: Introduction-Air Wedge-Newton's Rings-Color of thin films.

Diffraction: Plane Diffraction, Grating-Theory of Plane Transmission Grating

Scattering: Types of Scattering-Raman Scattering-Tyndall Scattering

UNITV ELECTRONICS

Intrinsic and extrinsic semiconductor-PN Junction diode –Biasing of PN junction –V-I characteristics of junction Diode-Rectifiers _Half Wave-Full Wave and bridge rectifiers-Zener diode -Transistor-Characteristics of transistor-CB, CE Mode-Transistor as an Amplifier- Transistor as an Oscillator.

COURSE OUTCOME:

1. To identify the strength of the given object.
2. To calculate and find C.G of a various shapes.
3. Define different thermal Processes and understand loss of thermo dynamics.
4. Calculate wavelength difference and fringe width from the interference pattern.
5. To know about the Basic Circuits.

TEXT BOOK(S):

1. R. Murugeshan, Properties of matter, Chand& Co. Pvt.Ltd., Revised edition2012.
2. Narayanamoorthy and N. Nagarathinam, Mechanics-Part II, The National PublishingCompany, Chennai,2005.
3. Dr.N.Subramaniyam, Brijlal and Dr.M.N.Avathanulu, Optics, S.Chand &Co. Pvt.Ltd.- 25threvised edition, NewDelhi,2012.
4. V.Vijayendran,S.Viswanathan,DigitalFundamentals,Printers&PublishersPrivate Ltd, Chennai, 2004.

E_RESOURCES:

1. https://cutt.ly/Vhlco3J
2. https://youtu.be/amGa5RRrCss

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI - 614016.

DEPARTMENT OF PHYSICS

For the Students of I B.Sc., Mathematics / II B.Sc., Chemistry

---

Semester: II - AC- II: ALLIED PHYSICS PRACTICAL-I

Ins. Hrs./Week:3 **Course Credit:2** **Course Code : 20APY102P**

(Any 10 Experiments)

OBJECTIVES:

- To acquire basic understanding of laboratory technique and to educate and motivate the students in the field of Physics.

1. Non-Uniform bending – Pin and Microscope.
2. Uniform bending-scale and Telescope.
3. Surface tension and Interfacial Surface tension by Drop Weight Method.
4. Surface tension by Capillary Rise Method.
5. Coefficient of viscosity of liquid – Variable Pressure Head Method.
6. Thermal conductivity of a bad conductor – Lee's disc Method.
7. Specific heat capacity of liquid – Newton's cooling Method.
8. Spectrometer – Refractive index of a solid prism.
9. Spectrometer – Grating – Normal incidence.
10. Newton's Rings – 'R' determination.
11. Air wedge – Thickness of the given thin wire.
12. Stoke's method Viscosity of highly viscous liquid.

COURSE OUTCOME:

1. Understand the laboratory technique and to educate and motivate the students in the field of Physics.

TEXT BOOK(S):

1. Dr.S. Somasundaram, Practical Physics, Apsara Publications, Tiruchirappalli,2012.
2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, NewDelhi2011.

REFERENCE BOOK(S):

1. S. Srinivasan, A Text Book of Practical physics., Sultan Chand Publications.

E_RESOURCES:

https://youtu.be/Q8Otf6k3uGk
https://youtu.be/8DhfUz0idwM

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI - 614016.

DEPARTMENT OF PHYSICS

For the Students of I B.Sc., Mathematics / II B.Sc., Chemistry

---

Semester: II - AC- III: ALLIED PHYSICS - II

Ins. Hrs./Week:4 **Course Credit:3** **Course Code :20APY203**

OBJECTIVES:

- To know the Knowledge of the capacitors.
- To know the Knowledge magnetic materials and their applications.
- To know the Knowledge of atom models.
- To gain knowledge on particle detectors and accelerators.
- To understand the fundamentals of electronics and applications.

UNIT I ELECTROSTATICS

Coulomb's inverse square law – Gauss theorem and its applications (Intensity at a point due to a charged sphere & cylinder) – Principle of a capacitor – Capacity of a spherical and cylindrical capacitors – Energy stored in a capacitor – Loss of energy due to sharing of charges - Capacitors in series and parallel.

UNIT II MAGNETISM

Intensity of magnetization–Susceptibility–Types of magnetic materials–Properties of para, dia and ferromagnetic materials– Cycle of magnetization– Hysteresis – B-H curve – Applications of B-H curve – Magnetic energy per unit volume – Ferro magnets, ferri magnets and their applications.

UNIT III ATOMIC PHYSICS

Sommerfield's and Vector Atom Models–Pauli's exclusion Principle–Various quantum numbers and quantization of orbits. X-rays: Continuous and Characteristic X-rays – Mosley's Law and importance – Bragg's law – Miller indices – Determination of Crystal Structure by Laue's Powder photograph method.

UNIT IV NUCLEAR PHYSICS

Introduction – Nucleus – Classification of Nuclei – Nuclear Size – Charge – Mass and Spin – Liquid drop model. Nuclear Radiations and their properties, particle accelerators – Betatron and Proton Synchrotron - Four types of reactions–classifications of Elementary particles

UNIT V DIGITAL ELECTRONICS

Decimal– Binary–Octal and Hexa Decimal number systems and their Mutual Conversions –1'sand2's complement of a Binary number and Binary arithmetic (Addition, Subtraction, Multiplication and Division) – Binary Subtraction by 1's and 2's complement method – Basic logic gates – AND, OR, NOT, NAND, NOR and EXOR gates – NAND and NOR as universal building gates – Boolean Algebra – Laws of Boolean Algebra – De Morgan's Theorems – Their verifications using truth tables.

COURSE OUTCOME:

1. Identify the Presence of static electric charges and field due to static charges.
2. Know about the magnetic materials and their applications.
3. Understand the different atom models.
4. Know about the applications reactors.
5. Understand the Basic Logic gates.

TEXT BOOK(S):

1. R. Murugesan., Electricity and Magnetism. S. Chand & Co, New Delhi, Third Revised edition, 2001.
2. R. Murugeshan, Kiruthiga Sivaprasath, Modern Physics, S. Chand & Co, New Delhi,First edition, 1984.
3. R. S. Sedha, A text book of Digital Electronics, S. Chand & Co, New Delhi, First edition ,2004.

REFERENCE BOOK(S):

1. Narayanamurthi, Electricity and Magnetism, The National Publishing Co, First edition,1988.
2. J. B. Rajam, Atomic Physics., S. Chand & Company Limited, New Delhi, First edition,1990.
3. B. N. Srivastava, Basic Nuclear Physic, Pragati Prakashan, Meerut, 2005. 4. Albert Paul Malvino, Digital principles and Applications, McGraw-Hill International Editions, NewYork, 2002.
4. Albert Paul Malvino, Digital principles and Applications, McGraw-Hill International Editions, New York,2002.

E_RESOURCES:

1. https://cutt.ly/Vhlco3J

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE (AUTONOMOUS), SUNDARAKKOTTAI, MANNARGUDI - 614016.

DEPARTMENT OF PHYSICS

For the Students of I B.Sc., Mathematics / II B.Sc., Chemistry

---

Semester: II - AC- IV: ALLIED PHYSICS PRACTICAL II

Ins. Hrs./Week:3 **CourseCredit:2** **Course Code: 20APY204P**

(Any 10 Experiments)

OBJECTIVES:

- To acquire basic understanding of laboratory technique and to educate and motivate the students in the field of Physics.

1. Determine the frequency of a given tuning fork –Sonometer.
2. Measurements of length (or diameter) using Vernier calipers, Screw gauge and Travelling microscope.
3. Potentiometer – Ammeter calibration.
4. Carry Foster's Bridge – Resistance Determination.
5. Meter bridge – Specific resistance.
6. Characteristics of a Zener Diode-Break down voltage.
7. Basic logic gates – AND, OR and NOT gates using discrete components.
8. Verification of NAND and NOR as Universal gates.
9. Verification of De Morgan's theorem.
10. Verification of Boolean algebra (any five).
11. Characteristics of a junction diode –Forward resistance and knee voltage.
12. Potentiometer – low range voltmeter.

COURSE OUTCOME:

1. Understand the laboratory technique and to educate and motivate the students in the field of Physics.

TEXT BOOK(S):

1. Dr.S. Somasundaram, Practical Physics, Apsara Publications, Tiruchirappalli, 2012.
2. R. Sasikumar, Practical Physics, PHI Learning Pvt. Ltd, NewDelhi2011.

REFERENCE BOOK(S):

1. S. Srinivasan, A Text Book of Practical physics., Sultan Chand publications.

E_RESOURCES:

1 .https://youtu.be/aMrGe2r9nco
2. https://youtu.be/x3VvjHVBGDU

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI - 614016.

(For the Candidates admitted in the academic year 2020-2021)

DEPARTMENT OF PHYSICS

For the students of II B.Sc., COMPUTER SCIENCE

Semester: III - AC-I: APPLIED PHYSICS-I

Ins. Hrs./Week:4 **Course Credit: 4** **Course Code: 20APH301**

OBJECTIVES

- To understand the different kinds of circuits.
- To acquire the knowledge about AC circuits.
- To implement the logic circuits related with the computer field.

UNIT-I:CurrentElectricity **(12 Hours)**

Ohm's Law-Verification of Ohm's Law-Kirchoff's law- Applications of Kirchoff's law- Wheatstone's bridge- Metre bridge- Carey Foster's bridge- Potentiometer- Measurement of Current and Resistance- Calibration of low range Voltmeter.

UNIT-II: Alternating current **(12Hours)**

AC circuits with double components – measurement of current and voltage – power in an AC Circuit-Power Factor (derivation)- Wattless current – Choke - series and parallel resonant circuits - Impedance-Q factor-Selectivity and Sharpness of resonance.

UNIT-III: Number Systems, Codes And Logic Gates **(13Hours)**

Number Systems - Conversions - Binary: Addition, Subtraction, Multiplication, Division-8421 Code - BCD Code - Excess 3 code - Gray code - Binary to Gray and Gray to Binary Conversion - ASCII code – Basic and Derivative Gates: AND, OR, NOT, NAND, NOR, EX-OR, NAND&NOR as Universal Gates.

UNIT-IV: Boolean Algebra, Arithmetic And Combinational Logic Circuits (12 Hours)

Basic laws of Boolean algebra - De Morgan's theorem - Verification of Boolean expression using Boolean laws - Half-adder - Full adder - Half-Subtractor- Full subtractor (using gates)

UNIT-V:Semiconductor Memories **(11Hours)**

Introduction – ROM using diodes and transistors – ROM in terms of digital circuits –PROM – EPROM – EEPROM – ROM as a unit in micro computers – RAM – Static RAM – Memory expansion – Memory Parameters.

Total Lecture Hours- 60

COURSE OUTCOME

The students will able to,

1. Understand the concept of electric current flows in a circuit.
2. Gain the knowledge about AC concepts to analyze circuits.
3. Learn the different types of number systems as they related to computers.
4. Acquire the knowledge about various combinational logic circuits using basic gates.
5. Identification of new developments in semiconductor memory.

TEXT BOOK(S)

1. Narayanamurthi and Nagarathinam,1994, Electricity and Magnetism,The National Publishing Company,Madras.
2. Brijlal & Subramanian, 1995,Electricity and Magnetism, Ratan PrakashanMandir.
3. PuriV.K.,2011,Digital Electronics circuits and systems, TATA Mcgraw hill publications, NewDelhi.
4. Vijayendran. V & Subramanian. V,2012, Introduction to Integrated Electronics, S. Viswanath PVT Ltd., Chennai.
5. Sanjay D Jain, Applied Physics, Universities Press,Hyderabad,Telengana.

REFERENCE BOOK(S)

1. Murugeshan.R,2015,ElectricityandMagnetism,S.Chand&CompanyLtd.
2. Gothaman W.H., 1996,Digital Electronics, Prentice Hall of India PVT., NewDelhi.
3. Beiser Arthur, Concepts of Modern Physics, 7 th Edition, Mcgraw hill education,Europe.
4. D.N. Vasudeva, 2007,Electricity and MagnetismS.Chand&Co, twelfth edition.
5. S.Salivahanan,2018, Digital Circuits and Design, Oxford University Press 5th Edition.

E -RESOURCES

1. https://youtu.be/InSK7biFdbo
2. https://youtu.be/FFDMzbrEXaE
3. https://www.askiitians.com/revision-notes/physics/current-electricity.html
4. https://www.askiitians.com/revision-notes/physics/electromagnetic-induction-andalternating-current/
5. https://www.my-mooc.com/en/mooc/circuits-electronics-1-basic-circuit-mitx-6-002-__1x-0/

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2020 – 2021)

DEPARTMENT OF PHYSICS

For the students of II B.Sc., COMPUTER SCIENCE

Semester: III - AC- II: APPLIED PHYSICS PRACTICAL-I

Ins. Hrs./Week:3 **Course Credit:2** **Course Code:20APH302P**

(Any 10 Experiments)

OBJECTIVE

- It promotes the exhaustive requirements and expectations of the students to acquire practical knowledge for the theory given in their syllabus.

1. Metre Bridge-Specific Resistance.
2. Potentiometer-Measurement of Current.
3. Potentiometer-Calibration of low range voltmeter.
4. Carey Foster's Bridge- Specific Resistance.
5. Logic Gates (AND, OR, NOT, NAND, NOR and EX-OR) Using IC's.
6. NAND as Universal Gates.
7. Verification of De-Morgan's Theorems.
8. Half –Adder and Half –Subtractor using logic gates.
9. Full Adder and Full Subtractor using logic gates.
10. LCR - Series resonance circuit
11. LCR - Parallel resonance circuit
12. NOR as Universal Gates

COURSE OUTCOME

- Understand the laboratory technique and to educate and motivate the students in the field of Physics

TEXT BOOK (S):

1. Somasundram S.,2012, Practical Physics, Apsara Publications,Tiruchirappalli.
2. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli1998.

REFERENCE BOOK(S):

1. Srinivasan M.N. Balasubramanian S. &Renganathan R.,2000 A Text book of Practical Physics, Sulthan Chand & Sons, NewDelhi.

E_RESOURCES

https://youtu.be/Q8Otf6k3uGk
https://youtu.be/8DhfUz0idwM

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI - 614016.

(For the Candidates admitted in the academic year 2020-2021)

DEPARTMENT OF PHYSICS

For the students of II B.Sc., COMPUTER SCIENCE

Semester: IV - AC- III: APPLIED PHYSICS-II

Ins. Hrs./Week:3 **Course Credit:2** **Course Code: 20APH403**

OBJECTIVES

- To understand the properties of semi-conductor
- To study the applications in memory devices and gain knowledge of the opto electronic devices
- To study the applications of Op-amp.

UNIT-I:SemiconductorPhysics (12 Hours)

Theory of energy bands in crystals- Distinction between conductors, Insulators and Semiconductors – Intrinsic and Extrinsic semiconductors – Hall effect in semiconductor– Zener diode –V-I characteristics.

UNIT-II: Transistors (12 Hours)

Transistors - PNP and NPN transistors - DC Characteristics of CE and CB configuration-Hybrid parameters-Functions of Transistor as an amplifier – FET-N-channel FET - performance Characteristics- FET amplifier

UNIT-III:Lasers (10 Hours)

Laser - Basic concepts of stimulated emission –Population inversion and Meta stable state-He-Ne laser-Ruby laser -production – Advantages.

UNIT-IV:Opto-Electronic Devices LED (14 Hours)

Radiation transition - Emission spectra –Luminescent efficiency-Method of Excitation-Visible LED-Materials for LED - LED configuration and performance-Photo conduction –Photo diode-Photo transistor-seven segment display-LCD.

UNIT-V:Operational Amplifier (12Hours)

The basic operational amplifier– Inverting and Non inverting operational Amplifier –CMRR-Basic uses of operational amplifier as sign and scale changer and phase shifter - Adder – Sub tractor – comparator.

Total Lecture Hours-60

COURSE OUTCOME

The students will be able to

1. The knowledge of fundamentals of semiconductor physics enable the students to apply the various system
2. Design characterization and study of properties of material help the students for various applications
3. Gain the applications of LASER
4. The knowledge for using Opto electronic devices
5. Understand the basic concept of Op-amp

TEXT BOOK(S)

1. JacobMillman,1985,Micor electronics, McGraw Hill publications, New Delhi.
2. TherajaB.L.,2002,The fundamentals of solid state physics, Sultan Chand & Co.,Delhi.
3. MithalG.K.andVanvasi,2006,Pulse and Digital electronics, Khanna publication,New Delhi.
4. Vijayendran. V & Subramanian. V, 2012,Introduction to Integrated Electronics, S. Viswanath PVT Ltd.,Chennai.
5. L. Floyd,2013, Electronic Devices (Pearson Education, NewYork).

REFERENCE BOOK(S)

1. Ramanan,1994,Function Electronics, TMH, New Delhi.
2. Millman & Halkias, 1967,Electronics devices and Circuits, McGraw-Hill.
3. Sanjay D Jain,2012, Engineering Physics, Universities Press, Hyderabad, Telengana.
4. Gothaman W.H.,1996, Digital Electronics, Prentice Hall of India PVT., New Delhi.
5. W.T. Silvast,2003, Laser Fundamentals (Cambridge University Press, Cambridge).

E - RESOURCES

1. https://youtu.be/kiiA6WTCQn0
2. https://youtu.be/KynKHr2cXgk
3. https://bit.ly/3qomJYb
4. https://bit.ly/2JwMRix
5. https://youtu.be/AcxDiesy-nI

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI - 614016.

(For the Candidates admitted in the academic year 2020-2021)

DEPARTMENT OF PHYSICS

For the students of II B.Sc., COMPUTER SCIENCE

Semester: IV-AC- IV: APPLIED PHYSICS PRACTICAL-II

Ins. Hrs./Week:3 **CourseCredit:2** **Course Code:20APH404P**

(Any 10 Experiments)

OBJECTIVES

- Toacquirebasicunderstandingoflaboratorytechniqueandtoeducateandmotivatethestudentsin the field of Physics

1. Semiconductor diode-Characteristics.
2. Zener diode - Characteristics.
3. FET -Characteristics.
4. Transistor Characteristics-CE Configuration.
5. Transistor Characteristics-CE Configuration.
6. Inverting and non inverting operational amplifier using Op-amp.
7. Photo diode -V-I Characteristics.
8. Mathematical operator –addition, Subtraction using Op-amp. 9. BCD to Seven Segment Display
10. FET amplifier – Frequency response curve.
11. Single stage amplifier - Frequency response curve.
12. Op-amp as a comparator.

TEXT BOOK(S)

1.Somasundram S., 2012,Practical Physics, Apsara Publications,Tiruchirappalli.
2.Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli1998.

REFERENCE BOOK(S)

1. Srinivasan M.N. Balasubramanian S. &Renganathan R., 2000A Text book of Practical Physics, Sulthan Chand & Sons, New Delhi.

E_RESOURCES

1. https://youtu.be/aMrGe2r9nco
2. https://youtu.be/x3VvjHVBGDU

NON MAJOR ELECTIVE

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI - 614016.

(For the Candidates admitted in the academic year 2020-2021)

DEPARTMENT OF PHYSICS

For the second Year UG students

Semester: III - NME - I: ENERGY PHYSICS

Ins. Hrs./Week:2 **Course Credit: 2** **Course Code:20NMEPH31**

OBJECTIVES

- To know the available of the energy resources
- Enrich the solar concept
- To make the students to understand the present day crisis of need for Biomass energy and alternatives are provided.

UNIT -I: Conventional Energy Sources (6 Hours)

World reserve- Commercial energy sources and their availability – Various forms of energy – Renewable and Conventional energy system – comparison Coal, oil and natural gas – applications – Merits and Demerits.

UNIT- II: Solar energy (7 Hours)

Renewable energy sources – Solar energy-measurements –Solar heater (Water heater) – Crop dryers – Solar cookers (Box type cooker) -Photovoltaic generation – merits and demerits.

UNIT -III: Biomass energy fundamentals (5 Hours)

Biomass energy – classification – Photosynthesis – Biomass conversion process

UNIT- IV: Biomass Utilization (6 Hours)

Gobar gas plants – Wood gasification – advantage & disadvantages of biomass as energy source

UNIT -V: Other forms of energy sources (6 Hours)

Geothermal energy – Wind energy – Ocean thermal energy conversion.

Total Lectures Hours-30

COURSE OUTCOMES

1. Gain the knowledge of the availability of the energy resources
2. Understand the solar applications
3. Understand the present day crisis of need for Biomass energy and alternatives are provided.
4. Develop the biomass energy utilization
5. Analyze the various methods of energy production

TEXT BOOK(S)

1. D.P. Kothari, K.C. Singal & Rakesh Ranjan, 2008.Renewable energy sources and emerging Technologies, Prentice Hall of India Pvt. Ltd., New Delhi.
2. Suhas P Sukhatme, 2012..Solar energy -- Principles of thermal collection and storage, Second edition ,Tata McGraw-Hill Publishing company, New Delhi,
3. Michael E. MacKay ,2015.Solar Energy-Introduction, OUP Oxford, United Kingdom.
4. Sergio C.Capreda, 2013.Introduction to Biomass Energy Conversions, I st edition CRC Press.
5. S.C. Bhatia,R.K.Gupta 2018.Textbook of Renewable Energy, Wood head Publishing India Pvt Ltd:

REFERENCE BOOK(S)

1. S.A. Abbasiand Nasema Abbasi, 2008.Renewable Energy sources and their environmental impact, PHI Learning Pvt. Ltd., New Delhi.
2. Arno Smets 2016..,Solar energy-The physics and engineering of photovoltaic conversion, technologies and systems, UIT Cambridge.
3. P.Chartier,G.L. Ferrero, 1997.Biomass for Energy and the Environment, pergamon,
4. S.P.Sukhatme &J.K Nayak, 2017 .Solar Energy, Fourth Edition, Mc Graw Hill Education:.
5. Mehmet Kanoglu,Yunus A.Gengel &John M.Cimbala , 2020. Fundamentals and Applications of Renewable Energy, Mc Graw Hill Education,

E LEARNING RESOURSE(S)

1. **https://youtu.be/rzGPzVBQ00E**
2. **https://youtu.be/oos7fETc2OE**
3. **http://courses.edx.org**
4. **http://www.vssut.ac.in**
5. **http://atme.in**

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI – 614016

For the Candidate admitted in the academic year 2020-2021

DEPARTMENT OF PHYSICS

For the second year UG students

Semester: IV - NME - II: Laser Physics

Ins. Hrs. /Week: 2 **Course Credit: 2** **Course Code:20NMEPH42**

OBJECTIVES

- To know the fundamental properties and the various types of LASER
- The physical and engineering principles of laser operation and their applications.
- To gather other advanced medical applications and the knowledge of communication technology

UNIT -I: Fundamentals of LASER **(6 Hours)**

Spontaneous emission–Stimulated emission– Einstein A and B co-efficient – Meta stable state- Population inversion – Pumping – Laser Characteristics

UNIT- II: Production of LASER **(7 Hours)**

Helium – Neon Laser – Ruby Laser – CO_2 Laser – Semiconductor Laser

UNIT-III: Industrial Applications of LASER **(5 Hours)**

Laser cutting-Welding-Drilling-Hologram-Construction and reconstruction of hologram

UNIT -IV: Lasers in Medicine **(5 Hours)**

Lasers in Surgery – Lasers in ophthalmology – Lasers in cancer treatment

UNIT- V: Lasers in Communication **(7 Hours)**

Optic fibre communication – Total internal reflection – Block diagram of fibre optic communication system – Advantages of fibre optic communication

Total Lecture Hours-30

COURSE OUTCOME

The students will be able to

1.Understand the fundamental properties of LASER
2.Understand the various types of LASER
3.Enrich The physical and engineering principles of laser operation and their applications.
4.Enrich other advanced medical applications
5.Understand the knowledge of communication technology

TEXT BOOK(S)

1. N. Avadhanulu ,2001, An introduction to LASERS, S. Chand & Company.
2. S K Srivastava,2019, Laser Systems And Applications, 3rd Edition New Age International (P)Ltd Publishers
3. Basics of Laser Physics: For Students of Science and Engineering (Graduate Textsin Physics) ,7April2017
4. Vartan V. Ter-Mikirtychev Fundamentals of Fiber Lasers and Fiber Amplifiers 2020 Edition by Springer
5. Er.Namrata SaxenaYadav and Ajay Yadav,1 January 2020 ,FiberOptics.

REFERENCE BOOK(S)

1.William T. Silfvast,1998, Laser fundamentals, University Press, Published in South Asia by Foundation books, New Delhi.
2. K. Thyagarajan and A.K. Ghatak,1984 LASER Theory and Application, Mc Millan, IndiaLtd.
3. Hentschel Christian,HP's Fiber Optics Handbook : An Introduction and Reference Guide toFiber
4.Optic Technology and Measurement Techniques ,1 January19894.
5.WEBB, Handbook of Laser Technology and Applications (Three- Volume Set): LaserComponents, Properties, and Basic Principles, 1 December2003
6.Singh,2012, Lasers : theory, Principles andApplications.

E_RESOURCES

1.https://youtu.be/C23cRCZ2J98
2.https://bit.ly/3lAurLb