SWAMI DAYANANDA

COLLEGE OF ARTS & SCIENCE

Affiliated to Bharathidasan University,Tiruchirappalli.
Accredited by NAAC–'B++' Grade (With CGPA 2.99)(First Cycle)
UGC Recognized u/s 2(f) & 12 (B)
Dayananda Campus, Manjakkudi –612 610.Tamilnadu, India.

HANDBOOK

DEPARTMENT OF PHYSICS

INDEX

Profile of B.Sc., (Physics)

Bachelor of Science in Physics or BSc Physics is a 3 year undergraduate course, which deals with the nuances of Physics and its various properties. The curriculum is divided into 6 semesters, spanning over three years. It includes the specialized scientific study of Physics, Mathematics, and Chemistry in detail.

• Bachelor of Science in Physics or BSc Physics course provides foundation knowledge for a science-based career.

• It deals with developing scientific skills and creative thinking skills amongst the students and the power. It provides a deeper understanding of the fundamentals of Physics and mathematical concepts, through various theory subjects and practical sessions.

• Some of the BSc Physics subjects such as Thermodynamics, Force, Friction, Harmonic Motion, Inertia, velocity, electricity, etc are directly related to real-life learning and are learned through physics practical's.

Upon successful completion of the Bachelor of Science in Physics, any graduate student may opt for a Higher degree like M.Sc Physics, M.Phil Physics, M.Sc. Applied Physics, M.Sc.+ PhD (Physics and Astrophysics) or MBA. They may also pursue a career in the fields of Teaching, R&D, Aerospace, manufacturing, engineering, and more.

Career & Jobs

- The different roles of employment that are explored by BSc Physics graduates are:
- Physics Home Tutor
- Assistant Professor
- Physics Degree Lecturer
- Associate Auditor
- Proofreader
- Radiologist
- Statistician

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI - 620 024.

B.Sc. PHYSICS

CHOICE BASED CREDIT SYSTEM –

LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)

(Applicable to the candidates admitted from the academic year 2022-23 onwards)

Sem.	Part	Course	Title	Ins. Hrs	Credit	Exam Hours	Marks		Total
							Int.	Ext.	
I	I	Language Course – I Tamil $ / Other Languages + #		6	3	3	25	75	100
	II	English Course - I		6	3	3	25	75	100
	III	Core Course – I (CC)	Properties of Matter and Acoustics	5	5	3	25	75	100
		Core Practical – I (CP)	Properties of Matter	4	4	3	40	60	100
		First Allied Course – I (AC)		4	4	3	25	75	100
		First Allied Course – II (AC)		3	-	-	-	-	-
	IV	Value Education		2	2	3	25	75	100
	TOTAL			**30**	**21**	**-**	**-**	**-**	**600**
II	I	Language Course - II Tamil $ / Other Languages + #		6	3	3	25	75	100
	II	English Course - II		6	3	3	25	75	100
	III	Core Course – II (CC)	Mechanics and Theory of Relativity	5	5	3	25	75	100
		Core Practical – II (CP)	General Physics I	4	4	3	40	60	100
		First Allied Course – II (AC)		3	2	3	25	75	100
		First Allied Course – III (AC)		4	4	3	25	75	100
		Add on Course – I ##	Professional English – I	6*	4	3	25	75	100
	IV	Environmental Studies		2	2	3	25	75	100
	VI	Naan Mudhalvan Scheme (NMS) @@	Language Proficiency for Employability - Effective English	-	2	3	25	75	100
	TOTAL			**30**	**29**	**-**	**-**	**-**	**900**

III	I	Language Course – III Tamil $ / Other Languages + #		6	3	3	25	75	100
	II	English Course – III		6	3	3	25	75	100
	III	Core Course – III (CC)	Thermal Physics	5	5	3	25	75	100
		Core Practical - III (CP)	General Physics II	4	4	3	40	60	100
		Second Allied Course – I (AC)		4	4	3	25	75	100
		Second Allied Course (AP)		3	-	-	-	-	-
		Add on Course – II ##	Professional English - II	6*	4	3	25	75	100
	IV	Non-Major Elective I @ - Those who choose Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level **or** b) Special Tamil if Tamil language was studied upto 10^{th} & 12^{th} std.	Digital Electronics	2	2	3	25	75	100
	TOTAL			**30**	**25**	**-**	**-**	**-**	**700**
IV	I	Language Course –IV Tamil $ / Other Languages + #		6	3	3	25	75	100
	II	English Course – IV		6	3	3	25	75	100
	III	Core Course - IV (CC)	Electricity and Magnetism	5	5	3	25	75	100
		Core Practical - IV (CP)	Electricity	4	4	3	40	60	100
		Second Allied Course (AP)		3	2	3	40	60	100
		Second Allied Course – II (AC)		4	4	3	25	75	100
	IV	Non-Major Elective II @ - Those who choose Tamil in Part I can choose a non-major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studied in school level **or** b) Special Tamil if Tamil language was studied upto 10^{th} & 12^{th} std.	Medical Physics	2	2	3	25	75	100
	VI	Naan Mudhalvan Scheme (NMS) @@	Digital Skills for Employability	-	2	3	25	75	100
	TOTAL			**30**	**25**	**-**	**-**	**-**	**800**

V	III	Core Course -V (CC)	Optics	5	5	3	25	75	100
		Core Course – VI (CC)	Atomic and Molecular Physics	5	5	3	25	75	100
		Core Course – VII (CC)	Electronics	5	5	3	25	75	100
		Core Practical -V (CP)	Optics and Digital Electronics	4	4	3	40	60	100
		Major Based Elective – I (Any one)	1. Solid State Physics 2. Laser Physics	5	4	3	25	75	100
	IV	Skill Based Elective I	Electrical Wiring Fundamentals	4	2	3	25	75	100
		Soft Skills Development		2	2	3	25	75	100
	TOTAL			**30**	**27**	**-**	**-**	**-**	**700**
VI	III	Core Course - VIII (CC)	Nuclear Physics	6	5	3	25	75	100
		Core Course - IX (CC)	Theoretical Physics	6	5	3	25	75	100
		Core Practical – VI (CP)	Electronics, Microprocessor and Programming	4	4	3	40	60	100
		Major Based Elective – II (Any one)	1. Microprocessor and C Programming 2. Nanotechnology	5	4	3	25	75	100
		Project		4	3	-	20	80	100
	IV	Skill Based Elective – II	Domestic Electrical Appliances and Measuring Instruments	4	2	3	25	75	100
	V	Gender Studies		1	1	3	25	75	100
		Extension Activities **		-	1	-	-	-	-
	VI	Naan Mudhalvan Scheme (NMS) @@		-	2	3	25	75	100
	TOTAL			**30**	**27**	**-**	**-**	**-**	**800**
GRAND TOTAL				**180**	**154**	**-**	**-**	**-**	**4500**

List of Allied Courses

First Allied Course	**Second Allied Course**
Mathematics	Chemistry / Computer Science

$ For those who studied Tamil upto 10th +2 (Regular Stream).

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

Those who studied Tamil upto 10th +2 but opt for other languages in degree level under Part- I should study special Tamil in Part – IV.

The Professional English – Four Streams Course is offered in the 2nd and 3rd Semester (only for 2022-2023 Batch) in all UG Courses. It will be taught apart from the Existing hours of teaching / additional hours of teaching (1 hour /day) as a 4 credit paper as an add on course on par with Major Paper and completion of the paper is must to continue his / her studies further. (As per G.O. No. 76, Higher Education (K2) Department dated: 18.07.2020).

* The Extra 6 hrs / cycle as per the G.O. 76/2020 will be utilized for the Add on Professional English Course.

@ NCC Course is one of the Choices in Non-Major Elective Course. Only the NCC cadets are eligible to choose this course. However, NCC Course is not a Compulsory Course for the NCC Cadets.

** Extension Activities shall be outside instruction hours.

@@ Naan Mudhalvan Scheme

SUMMARY OF CURRICULUM STRUCTURE OF UG PROGRAMMES

Sl. No.	Part	Types of the Courses	No. of Courses	No. of Credits	Marks
1.	I	Language Courses	4	12	400
2.	II	English Courses	4	12	400
3.	III	Core Courses	9	45	900
4.		Core Practical	6	24	600
5.		Allied Courses I & II	4	16	400
6.		Allied Practical	2	4	200
7.		Major Based Elective Courses	2	8	200
8.		Add on Courses	2	8	200
9.		Project	1	3	100
10.	IV	Non-Major Elective Courses	2	4	200
11.		Skill Based Elective Courses	2	4	200
12.		Soft Skills Development	1	2	100
13.		Value Education	1	2	100
14.		Environmental Studies	1	2	100
15.	V	Gender Studies	1	1	100
16.		Extension Activities	1	1	0
17.	VI	Naan Mudhalvan Scheme	3	6	300
	Total		**46**	**154**	**4500**

PROGRAM OBJECTIVES:

- To impart knowledge of basic concepts, laws and principles of various branches of Physics.
- To inculcate appropriate logical skills to translate physical description into mathematical equations and vice versa
- To provide analytical skills to solve problems in physics
- To provide systematic training on experimental methods so as to mould the learners to address the problems encountered during their practical sessions on their own
- To make available all learning methods of physics to enable the students become independent learners and thereby promote them for further studies as well as employment.

PROGRAMME SPECIFIC OUTCOMES:

On successful completion of B.Sc., Physics Programme, the students would have

- learnt the basic concepts and principles of Physics
- understood the meaning of mathematical equations representing physical systems and thereby describe various aspects of physical states through graphs and diagrams
- been trained to apply the understood concepts to solve the problems in physics
- acquired practical, analytical and logical skills to carry out experiments and interpret the observed results `
- discovered the capability to be independent learners so as to become eligible for higher studies as well as employment and cope with the ever- changing societal needs.

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First Year **CORE COURSE I** **Semester I**

PROPERTIES OF MATTER AND ACOUSTICS

Code: **(Theory)** **Credit: 5**

COURSE OBJECTIVES:

- To inculcate the knowledge of certain properties of matter namely, elasticity, surface tension and viscosity.
- To enable the students to understand the basic concepts of sound.
- To describe the experimental techniques for the determination of properties so that the learner can do the experiments with better understanding.

UNIT – I ELASTICITY:

Introduction on the elastic and plastic nature of materials - 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 done on increasing the area of a surface - Angle of contact - Neumann's triangle - Excess pressure inside a liquid drop and soap bubble –Force between two plates separated by a thin layer of a liquid – Experimental determination of surface tension - Drop- weight method – Capillary rise method-Variation of surface tension with temperature.

UNIT – IV VISCOSITY:

Newton's law of viscous flow – streamlined and turbulent motion – Reynold's number - Poiseuille's formula 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 Stokes' formula – Viscosity of gases - Meyer's formula - Rankine's method -Variation of viscosity with temperature and pressure – Lubrication – Equation of continuity of flow -Bernoulli's theorem – Filter pump and Wings of an airplane.

UNIT – V ACOUSTICS:

Newton's Formula for the velocity of sound – Musical Sound and Noise – Speech – Characteristics of Musical sound – Intensity of sound – Measurement of intensity of sound – Decibel and Phon-Bel – Reverberation– Sabine's Reverberation formula– Factors affecting the Acoustics of Buildings – Sound distribution in an Auditorium – Requisites for good acoustics – Ultrasonics –Production of ultrasonic waves – Piezoelectric method–Detection of ultrasonic waves - Quartz crystal method – Applications of Ultrasonic waves.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only):

Modulus of toughness and modulus of elasticity for different types of concrete - Elasticity and Seismic waves – Bending beam load cell – Composite beams - Surface tension and wetting behaviour of nanofluids – Viscosity of nanofluids – Acoustics sensors.

REFERENCES:

1. R. Murugeshan, *Properties of Matte*r, S. Chand & Co. Pvt. Ltd., Revised edition, 2012.
2. D. S. Mathur, *Elements of Properties of Matter*, S. Chand & Co. Pvt. Ltd., Revised edition, 2010
3. Brijlal& N. Subramanyam, *Properties of Matter*, Vikas Publishing. Pvt. Ltd, 2005.
4. Brijlal& N. Subramanyam, *ATextBook of Sound*, Vikas Publishing. Pvt. Ltd, 2008.
5. Feynman,*Lectures on Physics*, Vol.I& II by Richard P. Feynman, The New Millennium Edition, 2012.
6. David Halliday and Robert Resnick, *Fundamentals of Physics* by Wiley Plus, 2013.
7. B. H. Flowers and E. Mendoza, *Properties of matter*, Wiley Plus, 1991.
8. H. R. Gulati, *Fundamentals of General properties of matter*, S. Chand & Co. Pvt. Ltd, 2012.
9. Chatterjee and Sen Gupta, *A treatise on general properties of matter*, New central Books agency (p) Ltd, Kolkata, 2001.
10. R.L.Saihgal, *A Text Book of Sound*, S. Chand & Co. Pvt. Ltd, New Delhi, 1979.

COURSE OUTCOME:

On successful completion of the course, the students will be able to

- Differentiate the moduli of elasticity of different materials
- Analyze the moduli of elasticity of materials made in the form of beams.
- Understand the practical applications of surface tension in real life.
- Acquire the knowledge of the flow of liquids based on their viscous nature and the variation of viscosity with temperature and pressure
- Understand the various characteristics of sound and their practical implications.

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First Year | **CORE PRACTICAL I** | **Semester I**

PROPERTIES OF MATTER

Code: | **(Practical)** | **Credit: 4**

(**ANY EIGHT EXPERIMENTS)**

COURSE OBJECTIVES:

- To impart the skill of using measuring instruments
- To motivate the learner to study some properties of materials by determining the elastic constants, surface tension and viscosity through experiments.
- To make the learner to realize the vibrations of stretched strings.

EXPERIMENTS:

1. Measurement of length (or diameter) using Vernier calipers, Screw gauge and travelling microscope.
2. Determination of Young's modulus - Non-uniform bending using pin and microscope.
3. Determination of Young's modulus - Uniform bending using pin and microscope.
4. Determination of Young's modulus - Cantilever depression usingscale and telescope.
5. Surface tension and interfacial surface tension – Drop weight method.
6. Surface tension by capillary rise method.
7. Coefficient of viscosity of a liquid - Poiseuille's flow method.
8. The viscosity of highly viscous liquid - Stoke's method.
9. Verification of laws of vibration of a stretched string and determination of the frequency of a tuning fork – Sonometer.
10. Determination of frequency of a tuning fork using Melde's string apparatus.
11. Absolute determination of M and H using deflection and vibration magnetometer.
12. Spectrometer - Determination of refractive index of a solid prism.

REFERENCES::

1. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirappalli, 2009.
2. Dr. S. Somasundaram, *Practical Physics*, Apsara Publications, Tiruchirappalli, 2012.
3. C. C. Ouseph, U.J. Rao and V. Vijayendran, *Practical Physics and Electronics*, Viswanathan Printers and Publishers, PVT Ltd, 2014.
4. S. Srinivasan, *A Text Book of Practical Physics*, S. Sultan Chand Publications, 2005

5. R. Sasikumar, *Practical Physics*, PHI Learning Pvt. Ltd, New Del, 2011.

COURSE OUTCOMES:

Upon completion of this course, the student would be able to

- Use the measuring instruments for accurate measurement of physical quantities required for the experiment.
- Know the elastic properties of structural materials from the experimental results.
- Realize practically the properties of liquids such as surface tension and viscosity.
- Acquire the experimental skill of verifying laws in Physics.
- Understand experimentally the vibrations of stretched strings.

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First Year **CORE COURSE II** **Semester II**

MECHANICS AND THEORY OF RELATIVITY

Code: **(Theory)** **Credit: 5**

COURSE OBJECTIVES:

- To provide a better insight into the change of position of any physical object or event and their consequences.
- To inculcate the Newton's law of gravitation and Kepler's laws of planetary motion and their implications
- To impart the knowledge of theory of relativity and its applications.

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 - 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 along a curved path - Motion of a railway carriage round a curved track- 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 CENTRE OF GRAVITY:

Moment of Inertia - Kinetic energy and angular momentum of rotating body - Perpendicular and parallel axes theorems - Acceleration of a body rolling down on inclined plane without slipping - Compound pendulum - Centre of suspension and centre of oscillation - Minimum period of a compound pendulum. - Centre of gravity of a body - C.G. of a solid hemisphere - C.G. of a solid cone – Centre of pressure – Centre of pressure of a triangular lamina immersed in a liquid.

UNIT – V THEORY OF RELATIVITY:

Galilean – Newtonian relativity - Galilean transformations – Michelson Morley experiment and its importance –Basic ideas of general theory of relativity - Lorentz transformations and its interpretation – consequence of Lorentz transformation – Length contraction, time dilation – relativistic addition of velocities – Mass energy equivalence.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only):

Applied mechanics and growing utilization of theoretical mechanics - Structural Engineering – Hydraulics - External fluid dynamics.

REFERENCES:

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.
3. R. Murugesan and KiruthigaSivaprasath - *Modern physics*, 18th Revised edition November -2017, S.Chand& Company Ltd., New Delhi.
4. D.S. Mathur, *Mechanics*, S. Chand & Company Ltd., New Delhi, 2007.
5. Venkataraman, M K, *Dynamics*, Trichy: Agasthiar Book Deport, 2011
6. R. Murugesan, *Mechanics and Mathematical Physics*, S. Chand & Company Ltd., New Delhi, 2008.
7. I. H. Shames, *Introduction to Solid Mechanics,* 2009.
8. David Tong, *Dynamics and Relativity*, University of Cambridge, 2012.
9. M. Ray and G. C. Sharma, *A text book of Dynamics*, Chand & Company Ltd., New Delhi. 13th revised edition, 2005.
10. D. RajanBabu, E. James Jebaseelan Samuel, P. Ramesh Babu, V. Ramasubramanian and C. AnuRadha, *Modern Physics*, Anuradha Publisher, 2010.
11. P. Duraipandian, LaxmiDuraiPandiyan and MuthamizhJayapragasam, *Mechanics* Chand & Company Ltd., New Delhi. 2000.
12. Agarwal, J P, *Elements of Mechanics*, India: PragatiPrakashan, 2010.
13. Knight W D, Ruderman M A, Helmholz A C and Moyer B J, *Mechanics*, Berkeley Physics Course: Volume 1, 2nd Edition (2011)
14. Kleppner D and Kolenkow R J, *An Introduction To Mechanics* (Special Indian Edition) (2007).
15. *University Physics*. F.W. Sears, M.W. Zemansky and H.D. Young, 13/e, 1986.Addison-Wesley.
16. https://www.mooc-list.com/tags/gravitation
17. https://archive.org/details/NPTEL-Physics
18. https://www.academia.edu/8233163/Basics_of_Mechanics_notes_

COURSE OUTCOMES:

Upon completion of this course, the students would be able to

- Use the principles of projectiles to explain the manner in which gravity affects a projectile motion.
- Gain a deeper knowledge of mechanics and its fundamental concepts.
- Acquire the knowledge of gravitational force between objects and the centre of mass of objects.
- Learn rigid body dynamics in terms of moment of inertia and also analyze the center of gravity of different bodies.
- Analyze the special theory of relativity and its applications.

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First Year | **CORE PRACTICAL II** | **Semester II**

GENERAL PHYSICS I

Code: | **(Practical)** | **Credit: 4**

(ANY EIGHT EXPERIMENTS)

COURSE OBJECTIVES:

- To enhance the experimental skills of students.
- To develop the knowledge of laws and theorems in Physics through experimental study.
- To make the students realize the optical properties of certain materials by doing experiments.

EXPERIMENTS:

1. Determination of Young's modulus – Uniform bending by Koenig's method.
2. Determination of Rigidity modulus- Static Torsion method.
3. Determination of Rigidity modulus and moment of inertia using Torsional pendulum.
4. Sonometer - AC frequency.
5. Determination of 'g' and 'k' using a compound pendulum.
6. The figure of merit of a mirror Galvanometer.
7. Concave lens – Determination of focal length.
8. Determination of focal length, radius of curvature and refractive index of a long focus convex lens.
9. Air wedge- Determination of thickness of a thin wire.
10. Spectrometer – Determination of Refractive index of a hollow prism
11. Spectrometer– Determination of Refractive index of a liquid using a prism.
12. Spectrometer – Small-angle prism.

REFERENCES:

1. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirappalli, 2009.
2. Dr.S. Somasundaram, *Practical Physics*, Apsara Publications, Tiruchirappalli, 2012.
3. C.C.Ouseph, U.J.Rao and V.Vijayendran, *Practical Physics and Electronics*, Viswanathan Printers and Publishers, PVT Ltd (www.svprinters.com), Chetpet, Chennai – 2014.
4. S. Srinivasan, *A Text Book of Practical Physics*, S.Sultan Chand Publications. 2005.
5. R. Sasikumar, *Practical Physics*, PHI Learning Pvt. Ltd, New Delhi, 2011.

COURSE OUTCOME:

Upon completion of this course, the students would be able to

- Know the techniques of handling laboratory instruments.
- Evaluate a process based on the results obtained from the experiments quantitatively and qualitatively.
- Use the results of an experiment to describe a phenomenon.
- Develop the capacity of experimenting collaboratively and ethically.
- Acquire the skill of analyzing the properties of materials.

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BHARATHIDASAN UNIVERSITY TIRUCHIRAPPALLI - 620 024.

ALLIED PHYSICS FOR B.Sc. PROGRAMMES

(For the candidates admitted from the academic year 2022-23 onwards)

ALLIED COURSE I
PHYSICS I

Code: **(Theory)** **Credit: 4**

COURSE OBJECTIVES:

- To know the elastic nature of materials, analyze the expression for Young's modulus and comprehend about viscosity and surface tension of fluids.
- To acquire knowledge of the centre of gravity, states of equilibrium of rigid bodies and stability of floating bodies.
- To understand the laws of thermodynamics, thermal conductivity and blackbody radiation.
- To familiarize the concepts of interference and diffraction.
- To know the formation, characteristics and applications of diodes and transistors.

UNIT - I PROPERTIES OF MATTER:

Elasticity: Stress – Strain – Hooke's law – Young's modulus - Behaviour of wire under progressive tension – Bending of beams – Expression for the bending moment – Measurement of Young's modulus by bending of beams – 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.

UNIT - II MECHANICS:

Centre of Gravity – Centre of Gravity of a solid hemisphere – Hollow hemisphere – Solid cone.
States of Equilibrium: Equilibrium of a rigid body –Stable, unstable and neutral equilibrium – Example.
Stability of Floating bodies – Metacentre – Determination of Metacentric height of a ship.

UNIT - III THERMAL PHYSICS:

Thermodynamics: Laws of thermodynamics – Reversible and irreversible process – Heat engine – Carnot's theorem.

Radiation: Black body – Stefan's law – Newton's law of cooling – Newton's law of cooling from Stefan's law – Experimental determination of Stefan's constant –Wien's displacement law – Rayleigh - Jean's law – Planck's law.

Heat Conduction: Coefficient of Thermal Conductivity –Determination of Thermal Conductivity of a bad Conductor by Lee's disc method.

UNIT - IV OPTICS:

Interference: Superposition of waves –Principle of interference – Air wedge – Newton's rings.

Diffraction: Introduction –Plane diffraction Grating – Theory of plane transmission Grating.

Fiber Optic communication: Introduction – Optic Fiber – Numerical Aperture – Coherent bundle – Fiber optic communication System and its advantages.

UNIT – V 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 – Characteristics of Zener diode – Voltage regulator – Transistor – Characteristics of transistor – CB and CE mode –Transistor as an amplifier.

UNIT – VI CURRENT CONTOURS (For internal continuous assessment only):

Reinforced concrete–Advanced Nano photonics–Surface tension of thermal fluids–Nano fluids–Low Viscous silicon liquid immersed transformers – Bio diesel – fueled diesel engines –Electronic transformers.

REFERENCES:

1. R.Murugeshan, *Properties of matter,* S.Chand & Co. Pvt. Ltd., Revised Edition, 2017.
2. Narayanamoorthy and N.Nagarathinam, *Mechanics Part II*, The National Publishing Company, Chennai, 2005.
3. Dr.N.Subramaniyam, Brijlal and Dr.M.N.Avathanulu, *Optics*, S.Chand & Co. Pvt. Ltd. - 5 Edition, New Delhi, 2015.
4. BrijLal, N.Subrahmanyam, P.S.Hemne, *Heat and Thermodynamics and Statistical Physics,* S.Chand & Co. Pvt. Ltd., Revised edition, 2021.
5. V.Vijayendran, S.Viswanathan, *Digital Fundamentals,* Printers & Publishers Private Ltd, Chennai, 2004.
6. Brijlal and Subramaniyan, *Properties of Matter*, S.Chand & Co. Pvt. Ltd, 2005.

7. D S Mathur, *Mechanics*, S.Chand & Co. Reprint Edition, 2006
8. Brijlal and Subramaniyan, *Thermal Physics*, S.Chand & Co., 2001.
9. R.Murugeshan and Kiruthiga Sivaprasath, *A Text Book of Optics*, S.Chand & Co. Pvt. Ltd.- 9 threvised edition Ramnagar, New Delhi, 2014.
10. V.K.Mehta and Rohit Mehta, *Principles of Electronics*, S.Chandand company Ltd., 2015.
11. https://byjus.com
12. https://digitalcommons.unl.edu/cgi/viewcontent.
13. https://sciencing.com

COURSE OUTCOME:

Upon completion of this course, the students would be able to

- Apply the concepts of elasticity, viscosity and surface tension to solve problems encountered in everyday life.
- Understand the centre of gravity, states of equilibrium of rigid bodies and also stability of floating bodies.
- Understand the laws of thermodynamics, thermal conductivity and black body radiation.
- Understand the theories and experiments on interference and diffraction using air wedge, Newton's ring and grating.
- Know the formation, characteristics and applications of diodes and transistor.

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ALLIED PRACTICAL

PHYSICS PRACTICAL I

Code: **(Practical)** **Credit: 2**

COURSE OBJECTIVES:

- To educate and motivate the students in the field of Physics.
- To acquire the skill of handling instrument.
- To develop the observation and circuit drawing skills.
- To enhance the process-oriented performance skills.
- To inculcate the skill of experimental verification of laws in Physics.

(ANY12 EXPERIMENTS)

EXPERIMENTS:

1. Determination of Young's modulus by Non-Uniform bending using Pin and Microscope.
2. Determination of Young's modulus by Uniform bending using Scale and Telescope.
3. Surface tension and Interfacial Surface tension by Drop weight Method.
4. Coefficient of viscosity of a liquid –Variable Pressure head Method.
5. Specific heat capacity of a liquid by Newton's law of cooling Method.
6. Thermal conductivity of a bad conductor by Lee's disc Method.
7. Spectrometer–Refractive index of a solid prism.
8. Spectrometer–Finding the wavelength of spectral lines using Grating–Normal incidence method.
9. Newton's Rings–Determination of radius of curvature of a long focus lens.
10. Air wedge –Thickness of the given thin wire.
11. Meter bridge–Determination specific resistance of a coil.
12. Carry Foster's Bridge – Determination of specific resistance of a coil.
13. Potentiometer – Calibration of a Low range voltmeter.
14. Characteristics of a Junction diode–Forward resistance and knee voltage.
15. Characteristics of a Zenerdiode – Break down voltage.
16. Basic logic gates – AND, OR and NOT gates using discrete components.
17. Basic logic gates – AND, OR and NOT gates using ICs.
18. Realizing NAN Dasa Universal gate.
19. Realizing NOR as a Universal gate.
20. Verification of De-Morgan's theorem.

REFERENCES:

1. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli - 2009.
2. Dr.S.Somasundaram, *Practical Physics,* Apsara publications, Tiruchirapalli, 2012.
3. M.N.Srinivasan, S.Balasubramanian, R.Ranganathan, *A text*

book of Practical Physics, S.Sultanch and publications, New Delhi, 2013.
4. Dr.R.K. Shukla, Dr.Anchal Srinivastava, *Practical Physics*, New Age International (P) Ltd, India, 2022.
5. P. R.Sasikumar, *Practical Physics*, PHI Learning Pvt. Ltd, New Delhi, 2011.
6. C.L.Arora, *A Text Book of Practical Physics*, S.Sultanch and publications, New Delhi, 2019.
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8. N.N.Ghosh, *B.Sc Practical Physics*, Bharath Bhawan Publications, India, 2nd Edition 2017.
9. https://www.kanchiuni.ac.in/maths
10. https://nptel.ac.in/courses

Course Outcome:

Upon completion of this course, the student would be able to :

- Understand the Laboratory techniques.
- Evaluate a process based on the results obtained from the experiments quantitatively and qualitatively.
- Extend the scope of investigation as expected.
- Communicate a process with help of the outcomes of an experiment.
- Develop the skill of conducting an experiment collaboratively and ethically.

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ALLIED COURSE II
PHYSICS II

Code: **(Theory)** **Credit: 4**

COURSE OBJECTIVES:

- To understand the Coulomb's law and Gauss theorem and to gain a brief knowledge of capacitors.
- To acquire the knowledge on properties, types of magnetic materials and hysteresis of ferromagnetic material.
- To know atom models and understand the properties, types of x-rays and Crystal structure.
- To study the basics of nucleus and their properties, nuclear reaction, nuclear models and elementary particles.
- To learn the binary number system, binary arithmetic operations, logic gates and De-Morgan's theorem.

UNIT - I ELECTROSTATICS:

Coulomb's inverse square law – Gauss theorem and its applications - Intensity at a point due to a charged sphere and 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–Types of capacitors.

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-Hcurve–Magnetic energy per unit volume–Ferro magnets and their applications.

UNIT - III ATOMIC PHYSICS:

Atom Models: Summerfield's and Vector atom Models – Pauli's exclusion principle –Various quantum number sand quantization of orbits.

X-rays: Continuous and Characteristic X-rays – Mosley's Law and its importance –Bragg's law – Miller indices – Determination of Crystal Structure by Laue's Powder photo graph 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 – Proton Synchrotron – Four types of reactions –Elementary particles and their classifications.

UNIT - V DIGITAL ELECTRONICS:

Decimal–Binary Octal and Hexa Decimal number systems and their Mutual Conversions – 1's and 2's complement of a Binary number and Binary arithmetic (Addition, Subtraction, Multiplication and Division) – Binary Subtraction by 1's and2's complement method – Basic logic gates –AND, OR, NOT – NAND, NOR and EX-OR gates – NAND and NOR as universal gates – De-Morgan's Theorems.

UNIT – VI CURRENT CONTOURS (For internal continuous assessment only):

Magnetic and electromagnetic components- Atom interferometer- Nuclear reactor simulations – Cold fusion – Artificial intelligence – Electronic School books.

REFERENCES:

1. R.Murugeshan, Er.Kiruthiga Sivaprasath, *Modern Physics*, S.Chand & Co, New Delhi, First edition, 2004
2. R.Murugeshan, *Electricity and Magnetism*, S.Chand & Co, New Delhi,Third Revised Edition, 2008.
3. Brijlal & Subramanian, *Electricity and Magnetism,* Ratan Prakashan Mandir, 1995.
4. R.S.Sedha, *A text book of Digital Electronics*, S.Chand & Co, New Delhi, First Edition, 2008.
5. R.Murugesan, *Allied Physics Paper I and II*, S.Chand & Co, New Delhi, Revised Edition, 2010.
6. Arthur Beiser, Mahajan, Choudhury, *Concepts of Modern Physics*, Pustakkosh Pubications, India, 2015
7. GurbinderKaur, Gary R Pickrell, *Modern Physics*, Tata Mcgraw Hill Educational (P) Ltd, India, 2014.
8. Narayanamurthi, *Electricity and Magnetism*, The National Publishing Co, First Edition, 1988.
9. J.B.Rajam, *Atomic Physics*, S.Chand & Company Limited, New Delhi, First Edition, 1990.
10. B.N.Srivastava, *Basic Nuclear Physic*, Pragati Prakashan, Meerut, 005.
11. Donald P.Leach, Albert Paul Malvino, Goutam Saha, *Digital principle and Applications,* Mc Graw-Hill Publishing Company, 6th Editions, New York, 2008.
12. https://wepdf.com/al/allied-physics
13. https://archive.nptel.ac.in/courses
14. https://nptel.ac.in/courses

COURSE OUTCOME:

Upon completion of this course, the student would be able to

- Understand Coulomb's law, Gauss theorem and gain a brief knowledge of capacitors.
- Understand the properties, types of magnetic materials and hysteresis of ferromagnetic material.
- Acquire the knowledge of atom models and X rays.
- Know the basics of nucleus and their properties, nuclear reaction, nuclear models and elementary particles.
- Learn the binary number system, binary arithmetic operations, logic gates and De-Morgan's Theorem.

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BHARATHIDASAN UNIVERSITY **TIRUCHIRAPPALLI - 620 024**

PART-IV VALUE EDUCATION COURSE

FOR ALL UG ARTS, SCIENCE, COMMERCE AND MANAGEMENT
CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)
(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

First Year	**PART-IV**	**Semester-I**
	VALUE EDUCATION	
Code:	**(Theory)**	**Credit: 2**

OBJECTIVES:

- To understand the philosophy of life and values through Thirukural
- To analyse the components of values education to attain the sense of citizenship
- To understand different types of values towards National Integration and international understanding
- To learn yoga as value education to promote mental and emotional health
- To understand human rights, women rights and other rights to promote peace and harmony

UNIT I : PHILOSOPHY OF LIFE AND SOCIAL VALUES:

Human Life on Earth (Kural 629) -Purpose of Life (Kural 46) -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 VALUES AND CITIZENSHIP

Aim of education and value education: Evolution of value oriented education, Concept of Human values: types of Values- Character Formation – Components of Value education- A P J Kalam's ten points for enlightened citizenship- The role of media in value building

UNIT-III VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT:

Constitutional or national values: Democracy, socialism, secularism, equality, Justice, liberty, freedom and fraternity - Social Values: Pity and probity, self-control, universal brotherhood - Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith -Religious Values: Tolerance, wisdom, character - Aesthetic Values- Love and appreciation of literature and fine arts and respect for the same- National Integration and International Understanding.

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 : HUMAN RIGHTS:

Concept of Human Rights: Indian and international perspectives- Evolution of Human Rights- definitions under Indian and International documents -Broad classification of Human Rights and Relevant Constitutional Provisions: Right to Life, liberty ad Dignity- Right to equality- Right against exploitation- Cultural and Educational Right- Economic Rights- Political Rights- Social Rights - Human Rights of Women and Children – Peace and harmony.

UNIT - VI: CURRENT CONTOURS: (for continuous internal assessment only):

BOOKS FOR REFERENCES:

1. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Serfoji Nagar, Medical College Road, Thanjavur 613 004
2. திருக்குறள் - ஜி.யு.போப் - ஆங்கில மொழியாக்கத்துடன் உமா நூல், வெளியீட்டகம், தஞ்சாவூர்,
3. Leah Levin, Human Rights, NBT, 1998
4. V.R. Krishna Iyer, Dialetics and Dynamics of Human Rights in India, Tagore Law Lectures.
5. Yogic Thearpy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
6. SOUND HEALTH THROUGH YOGA - Dr.K.Chandrasekaran, Prem Kalyan Publications, Sedaptti, 1999.
7. Grose. D. N – "A text book of Value Education' New Delhi (2005)
8. Gawande . EN – "Value Oriented Education" – Vision for better living. New Delhi (2002) Saruptsons
9. Brain Trust Aliyar- "Value Education for Health, Happiness and Harmony" Erode (2004) Vethathiri publications

COURSE OUTCOMES: After completion of the course, the student will be able to:

- Apply the values in thirukural to be peaceful, dutiful and responsible in family and society
- Develop character formation and sense of citizenship
- Be secular, self-control, sincere, respectful and moral.
- Master yoga, asana and meditation to promote mental health
- Be attitudinal to follow the constitutional rights

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BHARATHIDASAN UNIVERSITY **TIRUCHIRAPPALLI - 620 024**

PART-IV ENVIRONMENTAL STUDIES COURSE

FOR ALL UG ARTS, SCIENCE, COMMERCE AND MANAGEMENT
CHOICE BASED CREDIT SYSTEM – LEARNING OUTCOMES BASED CURRICULUM FRAMEWORK (CBCS - LOCF)
(Applicable to the candidates admitted from the academic year 2022-2023 onwards)

First Year	**PART-IV**	**Semester-II**
	ENVIRONMENTAL STUDIES	
Code:	**(Theory)**	**Credit: 2**

COURSE OBJECTIVES:

- To appreciate the scope of Environmental Studies, Community ecology and the interdisciplinary nature of environmental issues
- To have a basic knowledge of Natural resources its classification, concepts, and natural resources of India.
- The course designed to gain knowledge on values of biodiversity and conservation on global, national, and local scales
- To study about sources and effects of environmental pollution like air, water, soil, thermal, marine, nuclear and noise
- To understand the concerns related to Sustainable Development on environment and health
- To introduce the students in the field of Law and Policies and Acts both at the national and international level relating to environment.

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: 3 Ecosystems

- 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:-
- 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
- Biogeographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Biological Diversity Act 2002/ BD Rules, 2004

(8 lectures)

Unit: 5 Environmental Pollution

Definition

Causes, effects and control measures of :

a. Air Pollution
b. Water Pollution
c. Soil Pollution
d. Marine Pollution
e. Noise pollution
f. Thermal Pollution
g. Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides.
- Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards, Types of Fire, Firework and Safety

(8 lectures)

Unit: 6 Social Issues and the Environment

- From Unsustainable to Sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people; its problems and concerns.

Case studies

- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation
- Public awareness.

(7 lectures)

Unit: 7 Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights - Value Education

- HIV/ AIDS - Women and Child Welfare
- Role of Information Technology in Environment and human health
- Case studies.

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 Ltd Bikaner.
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 Eastern Ltd
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11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub. House, Delhi 284 p.
12. Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions, Web enhanced edition 639 p.
13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications (TB)
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16. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345 p.
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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) Reference (TB) Textbook

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Rules,%202004.pdf.

COURSE OUTCOMES:

- Understand the environmental importance including interactions across local to global scales.
- The learners to update and analyze environmental relationships and interactions of environmental components
- The student to gain knowledge on importance of natural resources in a systematic way.

- The course content is introduce the concept of renewable and non-renewable energy resources and its scenario in India and at global level
- The students will know the relationship between biodiversity and ecosystem functions, direct and indirect values of biodiversity resources and their bioprospecting opportunities.
- The learners can gain awareness related on environmental pollution, causes and pollution control with case studies.
- Student to obtain the environmental ethics and gain knowledge about the sustainable development.
- Learners should realize the environmental legislation and policies of national and international regime and know the regulations applicable to industries and other organizations with significant Environmental aspects

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PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCES-I

OBJECTIVES:

- To develop the language skills of students by offering adequate practice in professional contexts.
- To enhance the lexical, grammatical and socio-linguistic and communicative competence of first year physical sciences students
- To focus on developing students' knowledge of domain specific registers and the required language skills.
- To develop strategic competence that will help in efficient communication
- To sharpen students' critical thinking skills and make students culturally aware of the target situation.

LEARNING OUTCOMES:

- Recognise their own ability to improve their own competence in using the language
- Use language for speaking with confidence in an intelligible and acceptable manner
- Understand the importance of reading for life
- Read independently unfamiliar texts with comprehension
- Understand the importance of writing in academic life
- Write simple sentences without committing error of spelling or grammar

(Outcomes based on guidelines in UGC LOCF – Generic Elective)

UNIT 1: COMMUNICATION

1. **Listening**: Listening to instructions

2. **Speaking**: Telephone etiquette and Official phone conversations

3. **Reading** short passages (3 passages, one from each – Physics, Chemistry, Mathematics/Computer Science)

5. **Writing:** Letters and Emails in professional context

6. **Grammar in Context:**
    - Wh and yes or no,
    - Q tags
    - Imperatives

7, **Vocabulary in Context:** Word formation - .
    i) Creating antonyms using Prefixes
    ii) Intensifying prefixes (E. g inflammable)

Changing words using suffixes

A) Noun Endings
B) Adjective Endings
C) Verb Endings

UNIT 2: DESCRIPTION

Listening – Listening to process description

Speaking - Role play

Formal: With faculty and mentors in academic environment, workplace communication

Informal: With peers in academic environment, workplace communication

Reading –Reading passages on products, equipment and gadgets

Writing – Writing sentence definitions (e.g. computer) and extended definitions (e.g. artificial intelligence)

Picture Description – Description of Natural Phenomena

Grammar in Context: Connectives and linkers.

Vocabulary – Synonyms (register) - Compare & contrast expressions.

UNIT 3: NEGOTIATION STRATEGIES

Listening - Listening to interviews of specialists / inventors in fields (Subject specific)

Speaking – Brainstorming. (mind mapping). Small group discussions (subject-specific)

Reading – longer Reading text. (Comprehensive passages)

Writing – Essay Writing (250 word essay on topics related to subject area, like pollution, use of pesticides in cultivation, merits and demerits of devices like mobile phones, merits and demerits of technology in development)

Grammar in Context: Active voice & Passive voice – If conditional - Collocations –Phrasal verbs

UNIT 4: PRESENTATION SKILLS

Listening - Listening to presentation. Listening to lectures. Watching – documentaries (discovery / history channel)

Speaking –Short speech

- Making formal presentations (PPT)

Reading – Reading a written speech by eminent personalities in the relevant field /Short poems / Short biography.

Writing - Writing Recommendations

Interpreting visuals - charts / tables/flow diagrams/charts

Grammar in Context – Modals

Vocabulary (register) - Single word substitution

UNIT 5: CRITICAL THINKING SKILLS

Listening - Listening to advertisements/news and brief documentary films (with subtitles)

Speaking – Simple problems and suggesting solutions.

Reading: Motivational stories on Professional Competence, Professional Ethics and Life Skills (subject-specific)

Writing Studying problem and finding solutions- (Essay in 200 words)

Grammar-Make simple sentences

Vocabulary -Fixed expressions

SUGGESTED ACTIVITIES

UNIT 1

Listening: Links for formal conversation can be given - Gap filling exercises – Multiple Choice questions – Making notes.

Speaking - Role play activity

Reading – Note making. Note-Taking.

Writing: Guided Writing (developing hints)

Email

Grammar: Vocabulary – Worksheets – Games.

UNIT 2

Listening-

Process Descriptions (Processes of Condensation and Evaporation./Process of Measuring the thickness of a wire using a Screw -Gauge./process of Exaction of sugar from sugarcane)

Speaking – Role Play

Reading – Multiple choice questions - Evaluative answers – Classifying and labeling

Writing - Picture description – Description of natural phenomena (rainbow, earthquake, volcanic eruption, erosion, natural disasters in 150 to 200 words).

Vocabulary: Expansion of compound nouns

UNIT 3

Listening- Gap fill exercises – Listening comprehension

Speaking -Debates

Reading -Reading comprehension

Writing – Essay Writing

Grammar - Vocabulary, Activities, Worksheets & Games.

UNIT 4

Listening - Note taking (of listening & viewing items) - Filling a table based on the listening item.

Speaking – JAM, Presentations. (PPT-TECHNICAL)

Reading-Reading comprehension

Writing– Difference between recommendations and instructions

Questions/MCQs based on graphs/flow diagrams/charts

Grammar: Vocabulary – Activities, Worksheets & Games.

UNIT 5

Listening – Radio News/ TV-News telecast /

Speaking - Watch or listen to documentaries and ask questions

Reading - Reading motivational stories (success stories in subject area)

Writing - Essay writing.

Grammar -Vocabulary –Activities, Worksheets & Games

Second Year **CORE COURSE III** **Semester III**

THERMAL PHYSICS

Code **(Theory)** **Credit: 5**

COURSE OBJECTIVES:

- To make the students understand the Quantum theory of specific heat capacities of solids
- To impart the knowledge of changes of entropy in different process
- To make the learners evaluate the thermal conductivities of good and bad conductors
- To make the students to know the different sources of energy
- To provide knowledge so that the students can apply the principle of Refrigerating mechanism

UNIT – I THERMODYNAMICS:

Laws of Thermodynamics: Zeroth law - First law – Second law of Thermodynamics - Heat engines -Isothermal and adiabatic processes - Reversible and irreversible processes - Carnot's theorem - Proof - Internal combustion engine (diesel engine). Entropy: Change of entropy in adiabatic process - Change of entropy in reversible and irreversible process - T-S diagram – Thermodynamic scale of temperature –Thermodynamic potentials - Maxwell's thermo dynamical relations.

UNIT – II CONDUCTION:

Conduction: Coefficient of thermal conductivity –Rectilinear Flow of Heat along a Bar - Thermal conductivity of good conductors: Forbe's method -Thermal conductivity of a bad conductor: Lee's disc method –Heat flow through a Compound Wall – Accretion of Ice on Ponds – Wiedemann- Franz law- Practical Applications of Conduction of Heat.

UNIT – III RADIATION:

Stefan's law – Stefan- Boltzmann law- Deduction of Newton's law of Cooling from Stefan's law-Determination of Stefan's constant (laboratory method) –Black Body Radiation – Wien's Displacement law- Rayleigh – Jeans law- Planck's Law - Solar constant –Surface Temperature of the Sun – Angstrom's Pyrheliometer – Sources of Solar Energy- Photovoltaic cell – Green House Effect.

UNIT – IV LOW TEMPERATURE PHYSICS:

Joule - Kelvin effect - Temperature of inversion - Porous plug experiment - Liquefaction of gases -Principle of regenerative cooling -Linde's process - Liquefaction of Hydrogen - Adiabatic demagnetization - Liquefaction of Helium – Practical Applications of Low Temperature - Refrigerating mechanism – Air Conditioning mechanism- Solid Carbon dioxide (Dry Ice).

UNIT – V SPECIFIC HEAT CAPACITY:

Specific heat capacity of solids – Regnault's method of mixtures - Radiation correction- Dulong and Petit's law – Einstein's theory - Specific heat of liquids – Newton's law of cooling

– Specific heat of gases –Mayer's Relation – Quantization of various contributions to energy of diatomic molecules – Specific heat of diatomic gases.

UNIT – VI CURRENT CONTOURS (For Continuous internal assessment only):

Waste thermal Energy – Waste Heat Recovery – Thermal Energy Storage – Thermal Storage materials – Phase change Materials – Thermal Energy Storage Applications: Waste heat to Electricity and Solar Thermal Energy

REFERENCES:

1. Brij Lal, Dr. N. Subrahmaniyam and P.S. Hemine, *Heat, Thermodynamics and Statistical Physics* - S.Chand& Co., New Delhi. 2015.
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7. M. Narayanamoorthy and N. Nagarathinam, *Heat*, National Publishing Co, Chennai, 8th edition, 1987
8. K. Pathak and Poppy Hazarika, *Thermal Physics,* Vishal Int. Ltd., 2020.
9. A.B Gupta And H.P.Roy, *Thermal Physics 5th Edition, Books & Allied P Ltd* 2020
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11. https://doi.org/10.1016/j.aej.2021.11.003
12. https://web.mit.edu
13. http://www.thermalfluidscentral.org/
14. https://www.grc.nasa.gov
15. https://peer.asee.org

COURSE OUTCOMES:

Upon successful completion of this course, the students would be able to:

- Recall the different specific heat capacities of matters.
- Understand the Maxwell's thermodynamic relations to relate the fundamental and derived quantities.
- Apply the knowledge of conduction of heat in practical applications.
- Use Stefan's constant to evaluate temperature of sun at a particular place.
- Analyze the different principles used in liquefaction of gases

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Second Year	**CORE PRACTICAL III GENERAL PHYSICS II**	**Semester III**
Code	**(Practical)**	**Credit: 4**

(ANY EIGHT EXPERIMENTS)

Objective:

To develop the skill of using laboratory instruments to determine some physical quantities required for the understanding of the logics and principles in physics.

Experiment

1. Specific heat capacity of a liquid- Newton's Law of cooling.
2. The emissive power of a surface -Spherical Calorimeter.
3. Joule's calorimeter- Specific heat capacity of a liquid.
4. Thermal conductivity of a bad conductor – Lee's disc method.
5. Spectrometer- i-d curve.
6. Spectrometer – i - i' curve
7. Spectrometer – Cauchy's constants.
8. Spectrometer – Grating – Normal incidence method.
9. P.O box – Determination of temperature coefficient of a coil.
10. Potentiometer – Calibration of an Ammeter.
11. Potentiometer – Temperature co-coefficient of a thermistors
12. Characteristics of a Junction diode and a Zener diode.

REFERENCES:

1. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli 2009
2. Dr. S .Somasundaram, *Practical Physics*, Apsara publications, Tiruchirapalli, 2012.
3. C.C. Ouseph, U.J. Rao and V. Vijayendran, *Practical Physics and Electronics*, Viswanathan Printers and Publishers, PVT Ltd (www.svprinters.com), Chetpet, Chennai.- 2014
4. S. Srinivasan, *A Text Book of Practical Physics*, S. Sultan Chand publications. 2005
5. R. Sasikumar, *Practical Physics*, PHI Learning Pvt. Ltd, New Delhi, 2011.

COURSE OUTCOME:

On completion of the course the learner will be able to:

- Realize practically some phenomena of Physics.
- Acquire the skill of handling instruments.
- Develop the observation and circuit drawing skills.
- Enhance the skill of performing process-oriented experiments.
- Verify the laws in Physics through experimental results.

Second Year **NON-MAJOR ELECTIVE I** **Semester III**

DIGITAL ELECTRONICS

Code **(Theory)** **Credit: 2**

Course Objectives:

- To understand the basics of Digital Electronics.
- To Study various logical circuits and their implementation.
- To acquire knowledge on various digital circuits like Adder, Subtractor, Multiplexer, Demultiplexer, Decoder and Encoder.

UNIT – 1 NUMBER SYSTEM AND BINARY CODES:

Number System: Binary –octal - decimal - hexadecimal number system – conversion- Binary addition and subtraction - Binary Codes: BCD - Excess 3– ASCII.

UNIT – II LOGIC GATES:

Basic logic gates – AND- OR – NOT – NAND - NOR - EX-OR gates - Boolean equations- NAND - NOR as Universal Building blocks.

UNIT - III BOOLEAN THEOREMS:

Laws of Boolean algebra - De-Morgan's theorem - Min term - Max term – POS – SOP - K Map - Simplification by Boolean theorems -Don't care condition.

UNIT – IV COMBINATIONAL LOGIC CIRCUITS:

Combinational Circuits and its implementations - Arithmetic Circuits - Adders and Subtractors - BCD Adder -Multiplexer - Demultiplexers - Encoders and Decoders.

UNIT - V SEQUENTIAL LOGIC CIRCUITS:

R-S and D Flip-flop - J-K and T Flip-flop - Ripple Counter - UP/Down Counters - Shift Register-Serial in serial out - Parallel in Parallel out.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only):

Memory Devices

Anatomy of Computer - A computer Systems - Computer Memory - RAM and ROM - Expanding Memory Capacity.

REFERENCES:

1. Anil K. Maini, "Digital Electronics: Principles, Devices and Applications" Wiley-India Pvt. Ltd, 1st Edition, 2008
2. David J. Comer "Digital Logic & State Machine Design", 3rd Indian Edition, Oxford University Press.
3. M Morris Mano, *Digital Logic and Computer Design*, 4th Edition, 2009,
4. Pearson, LPE, R.P.Jain, *Modern Digital Electronics*, McGraw-Hill, 4th ed. 2010.
5. Malvino& Leach *Digital Principles and Applications*, 7th Edition, McGraw-Hill Education
6. https://www.classcentral.com/course/youtube-digital-electronics-48205
7. https://www.youtube.com/watch?v=DBTna2ydmC0
8. https://nptel.ac.in/courses/108105132

COURSE OUTCOME:

Upon completion of this course, the student would be able to

- Perform conversion between various number systems.
- Apply knowledge of Boolean algebra and other minimization techniques for digital circuit design.
- Identify, formulate and solve a problem based on combinational circuits
- Select the appropriate hardware and software tools for combinational circuit design.
- Verify the functions of various digital integrated circuits.
- Evaluate the specifications of logic families.
- Create a course project using digital integrated circuits.

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Second Year **CORE COURSE IV** **Semester IV**

ELECTRICITY AND MAGNETISM

Code **(Theory)** **Credit: 5**

COURSE OBJECTIVES:

- To study the fundamental ideas on electrostatics and current electricity
- To classify materials based on their magnetic properties
- To understand the concept of resonance circuits

UNIT – I ELECTROSTATICS:

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 a point due to a uniformly charged conducting sphere – Principle of a capacitor– Capacity of a spherical and cylindrical capacitors – Energy stored in a charged capacitor–Loss of energy on sharing of charges between two capacitors.

UNIT – II CURRENT ELECTRICITY:

Ampere's circuital law and its applications -Field along the axis of a circular coil and Solenoid–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.

UNIT – III ELECTROMAGNETIC INDUCTION:

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 (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 and R– Measurement of High resistance by leakage.

UNIT – IV AC CIRCUITS:

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 –Power in AC circuits (R, L-R, L-C-R only) – Power factor–Watt less current – Choke Coil – Transformer – Uses of Transformers – Skin Effect.

UNIT – V MAGNETIC PROPERTIES OF MATERIALS:

Magnetic field – Magnetic induction – Intensity of Magnetization – Magnetic permeability – Susceptibility – Properties of para, dia, and ferromagnetic materials – Curie point - Curie temperature - Hysteresis – Retentivity – Coercivity – Experiment to draw B-H curve by magnetometer method – Loss of energy per cycle.

UNIT – VI Current contours (For continuous internal assessment only):

Maxwell's Equations, electromagnetic waves, reflection and refraction, wave guides, retarded potential, antennas, relativistic electrodynamics, four vectors, Lorentz, and transformation of fields.

REFERENCES:

1. BrijLal and N. Subrahmanyam, *A Text Book of Electricity and Magnetism*, S. Chand & Company Pvt. Ltd, New Deihi-2020.
2. R. Murugeshan, *Electricity and Magnetism*, S. Chand & Company Pvt. Ltd., New Delhi – 2017.
3. M. Narayanamurthy & N. Nagarathnam, *Electricity & Magnetism*, NPC pub., Revised edition-1992.
4. D. L. Sehgal, K. L. Chopra and N. K. Sehgal, *Electricity and Magnetism*, Sultan Chand& Sons. New Delhi-2020.
5. D.N.Vasudeva, *Electricity and Magnetism*, S.Chand& Co- 2011
6. K.K.Tewari, *Electricity and Magnetism*, S.Chand& Co-2002.
7. E.M.Pourcel, *Electricity and Magnetism*- Berkley Physics Course,Vol.2,McGrawHill Education; 2nd edition -2017.
8. D.C. Tayal, *Electricity and Magnetism*, Himalaya Publishing Co., Fourth Edition-2019.
9. D. Halliday, R.Resnick and J.Walker, *Fundamentals of Physics–Electricity and Magnetism*, iley India, Pvt Ltd -2011
10. David Griffith, *Introduction to Electrodynamics*, Pearson Education India Learning Private Limited; 4th edition- 2012.
11. R.B. Singh, *Fundamentals of Electricity and Magnetism,* New Age International (P) Ltd., Publishers-2018
12. BasudevGhosh,*Foundations of Electricity and Magnetism,* Books & Allied., Publishers-2021
13. Edward M. Purcell and Edward M. Purcell, *Electricity and Magnetism,* University printing house Cambridge- 2013
14. https://nptel.ac.in/courses/115104088
15. https://www.uou.ac.in/sites/default/files/slm/BSCPH-102.pdf

COURSE OUTCOMES:

On the completion of the course students will be able to:

- Understand fundamental laws of electricity and magnetism
- Analyze the calibration of electrical instruments.
- Verify the laws of electromagnetic induction
- Apply the knowledge of electricity and magnetism towards technological applications
- Differentiate magnetic materials

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Second Year	**CORE PRACTICAL IV ELECTRICITY**	**Semester IV**
Code	**(Practical)**	**Credit: 4**

(ANY EIGHT EXPERIMENTS)

Course Objectives:

Toprovide the knowledge on utilization of electrical devices to determine some electrical parameters by executing experiments.

EXPERIMENTS:

1. Meter bridge – Determination of specific resistance of a coil.
2. Determination of specific resistance – Carey Foster's Bridge.
3. Potentiometer – Calibration of low range voltmeter.
4. Potentiometer – Determination of resistance of a coil.
5. Potentiometer – emf of a thermocouple
6. Potentiometer – Calibration of high range voltmeter.
7. Anderson's Bridge – Self-inductance of a coil.
8. Field along the axis of a coil – Determination of moment.
9. B.G – Figure of merit.
10. B.G – Determination of mutual inductance.
11. Series resonance circuit.
12. Parallel resonance circuit.

REFERENCES:

1. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli 2009
2. Dr.S.Somasundaram,*PracticalPhysics*,Apsara Publications, Tiruchirapalli, 2012.
3. C.C.Ouseph,U.J.Rao and V.Vijayendran, *Practical Physics and Electronics*,Viswanathan Printers and Publishers,PVT Ltd (www.svprinters.com), Chetpet, Chennai- 2014
4. S. Srinivasan, *A Text Book of Practical Physics*, S. Sultan Chand publications. 2005
5. R. Sasikumar, *Practical Physics*, PHI Learning Pvt. Ltd, New Delhi, 2011.

COURSE OUTCOME:

On completion of the course the learner will be able to

- Analyze the electrical parameters of some electrical components.
- Carry out electrical experiments with better understanding.
- Develop observation and circuit drawing skills.
- Enhance the skills of troubleshooting electrical circuits.
- Calibrate some electrical instruments

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Second Year **NON-MAJOR ELECTIVE II** **Semester IV**

MEDICAL PHYSICS

Code **(Theory)** **Credit: 2**

Course Objectives:

- To familiarize students with basic principles of radiation physics and also X-ray Generators, Particle Accelerators used in radiotherapy.
- Understand the basic physics of the electromagnetic and particulate forms of ionizing & non ionizing radiation and understand the interaction of photons.
- Understand the distinctions between the units of radiation quantity, exposure and dose.

UNIT – 1 NON-IONIZING RADIATION:

Electromagnetic spectrum - Different sources of NonIonizing radiation, Radio-frequency, Microwaves, Infrared, Visible and Ultra violet radiation production, physical properties and their interaction with tissues.

UNIT – II IONIZING RADIATION:

Radiation sources- Exposure to ionizing radiation- Health effects of ionizing radiation- Interaction of electromagnetic radiation with matter - Photoelectric and Compton process and energy absorption - Pair production - Attenuation and mass energy absorption coefficients.

UNIT – III RADIATION QUANTITIES AND UNITS:

Particle flux and fluence - energy flux and fluence -Linear and mass attenuation coefficients - Mass energy transfer and mass energy absorption coefficients - Stopping power - LET Absorbed dose - Kerma – Exposure.

UNIT – IV MEDICAL PHYSICS IN DIAGNOSTIC RADIOLOGY:

Discovery - Production - Properties of X-rays -– characteristics of X-ray – different modalities of X- ray – fluoroscopy – mammography – C arm – Digital radiography – Computed tomography (CT) – different generation of CT - Nuclear Medicine.

UNIT – V MEDICAL PHYSICS IN RADIOTHERAPY APPLICATIONS:

Construction and working of Tele-cobalt units - The Resonant transformer - Cascade generator - Van De Graff Generator - Pelletron - Cyclotron - Betatron - Synchro-Cyclotron - Design and working of Linear Accelerator

Unit – VI Current Contours (For continuous internal assessment only):

Positron emission tomography (PET) – Single photon emission tomography (SPECT)- Electron Synchrotron - Proton synchrotron.

REFERENCES:

1. K. Thayalan, Basic Radiological Physics ***(2nd Ed)***, Jaypee Brothers Medical Publishers, New Delhi, (2017).
2. Faiz M. Khan & John P. Gibbons, *The Physics of Radiation Therapy* ***(4th Ed)***, Lippincott Williams & Wikins, Philadelphia, (2010).
3. E.B. Podgorsak, *Radiation Oncology Physics: A Handbook for Teachers and Students***,** INTERNATIONAL ATOMIC ENERGY AGENCY VIENNA, (2005).
4. W. R. Hendee, *Medical Radiation Physics*, Year Book Medical Publishers Inc., London, (2003).
5. Martin Hollins, *Medical Physics,* Nelson Thornes Ltd, 1991
6. Dinesh K Baghel, *Medical Physics, Peepee Publishers, 2017*
7. Stephen Keevil, Renato Padovani, SlavikTabakov, Tony Greener, Cornelius Lewis, *An Introduction to Medical Physics,* CRC Press, 2022
8. B.H Brown, R.H Smallwood, D.C. Barber, P.V Lawford, D.R Hose, Medical Physics and Biomedical Engineering, CRC Press, 1999.
9. J. R. Cameron, J. G. Skofronick, *Medical Physics,* John Wiley & Sons, 1980.
10. https://www.youtube.com/watch?v=p2rx8Qpw49w
11. https://www.aapm.org/meetings/2010AM/documents/biggs2.pdf
12. http://www-naweb.iaea.org/nahu/DMRP/documents/Chapter5.pdf

COURSE OUTCOMES:

Upon completion of this course, the students would be able to

- Gained knowledge about basic principle of medical physics.
- Understood the basic principles of Ionizing and non-ionizing radiations.
- Learnt the units of radiation.
- Understood the production and working principles of X-ray Generators.
- Learnt the theory of Interactions of photons with matter.

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Second Year **NON MAJOR ELECTIVE COURSE- I** **Semester-III**

TOUR OPERATIONS

Code: **(Theory)** **Credit: 2**

OBJECTIVES:

- To know the definition and concepts of tourism
- To understand the types of travel formalities
- To learn the Preparation of Tour Itinerary

UNIT- I TRANSPORT INDUSTRY:

Introduction to Transport Industry – Road Transport – Rail Transport - Cruise Liners Transportation - Reading of Railway Time Table – Railway Ticket Booking Procedures.

UNIT-II AIR TRANSPORT:

Development of Air Transport – Formation of IATA – Airline Industry (International and Domestic) - Role of Airlines in Tourism.

UNIT-III TRAVEL FORMALITIES:

Passport – VISA – Medical Certificates – Insurance – Customs - Foreign Exchange -Baggage allowance.

UNIT-IV TRAVEL AGENCY:

Evolution of Travel Agency – Departments and Functions of a Travel Agency - Source of income for Travel Agency.

UNIT-V TOURS OPERATIONS:

Origin of Tour Operations – Organising a Tour Program – Package Tours – Car Rentals – Tourist Guide Service -Preparation of Tour Itinerary – Tour Costing.

UNIT - VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Railway Ticket Booking Procedures - Baggage allowance - Organizing a Tour Program - Preparation of Tour Itinerary.

REFERENCE BOOKS:

1. Burkart and Melik, **Tourism -Past, Present and Future**, London, 1995.
2. R.M. Kaul, **Dynamics of Tourism** – **A Triology**, Vol.I., New Delhi, 1997.
3. Seth Pran Nath, Successful Tourism Practices, Vol.I., New Delhi, 1997.
4. Lonely Planet India, Guidebook, Travel literature

COURSE OUTCOME:

- Successful completion of this course will lead the students to appropriate knowledge in Tour operations.

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Second Year **NON MAJOR ELECTIVE COURSE-II** **Semester-IV**

CULTURAL TOURISM

Code: **(Theory)** **Credit: 2**

OBJECTIVES:

1. To gain the knowledge of Cultural Resources.
2. To understand the idea of Cultural Festivals
3. To get the knowledge of Cultural destinations.

UNIT- I CULTURAL TOURISM:

Definition - Meaning and Scope - Significance – Types of CulturalTourism Attractions - Culinary Traditions: North Indian - South Indian -Continental.

UNIT-II ARTS AND CRAFTS :

Music: Hindustani - Carnatic -Classical Dances: Kuchipudi, Odisi, Kathakali, Manipuri,Kadhak and Bharathanattiyam - Folk Dances.

UNIT-III CULTURAL RESOURCES OF NORTH INDIA :

Madura- Jaipur-Vaishnavadevi Temple Deccan Region: Konark – Amaravati- Somnathpur Temple -South India : Belur, Helibidu, Gurauvayur, Thiruppati- Madurai- Case studies: Darasuram, Velankanni.

UNIT-IV FESTIVALS:

Konark Festival in Odisha - Sarang Festival in Kolkata - Music Festival in Chennai- -Dance Festivals in Mamallapuram and Chidambaram - Music Festival in Thiruvaiyaru.

UNIT-V INDIAN CULTURAL DESTINATION – CULTURAL INSTITUTION IN INDIA:

Cultural Event Management – Preservation and Conservation of Monuments – Role of ASI, ICO, MOS -Mutts in India- Unique features of Tamil Culture: Chastity, Equality, Nobility, Charity , Justice.

UNIT - VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Hindustani Music - Culinary traditions of South India - Konark Festival–Role of ASI in heritage conservation.

REFERENCES :

1. V.s. Agarwal, the Heritage of Indian Art, Publications Divisions, Govt. of India, New Delhi.
2. A.L. Basham, The Wonder That was India, 3rd edition, London.
3. L. Basham, A Cultural History of India, Oxford University Press, New Delhi.
4. பண்டையநாகரிகங்கள் - எஸ்.எல். வி . மூர்த்தி
5. Art, Culture and Spirituality - Swami Atmaramananda&Dr.M.Sivaramkrishna.
6. The Book of Hindu Festivals and Ceremonies - Om Lata Bahadur.
7. Cultural Tourism In India- Luvkushmishra

COURSE OUTCOME:

- Successful completion of this course will lead the students to appropriate knowledge in Cultural Tourism.

Professional English [part-III -add on Course]

Weightage: 4 Credits Duration: 90hrs

Objectives:

The Professional Communication Skills Course is intended to help Learners in Arts and Science colleges

- Develop their competence in the use of English with particular reference to the workplace situation.
- Enhance the creativity of the students, which will enable them to think of innovative ways to solve issues in the workplace.
- Develop their competence and competitiveness and thereby improve their employability skills.
- Help students with a research bent of mind develop their skills in writing reports and research proposals.

Unit 1- Communicative Competence (18 hrs)

Listening – Listening to two talks/lectures by specialists on selected subject specific topics -(TED Talks) and answering comprehension exercises (inferential questions)

Speaking: Small group discussions (the discussions could be based on the listening and reading passages- open ended questions

Reading: Two subject-based reading texts followed by comprehension activities/exercises

Writing: Summary writing based on the reading passages.

Grammar and vocabulary exercises/tasks to be designed based on the discourse patterns of the listening and reading texts in the book. This is applicable for all the units.

Unit 2 - Persuasive Communication (18 hrs)

Listening: listening to a product launch- sensitizing learners to the nuances of persuasive communication

Speaking: debates – Just-A Minute Activities

Reading: reading texts on advertisements (on products relevant to the subject areas) and answering inferential questions

Writing: dialogue writing- writing an argumentative /persuasive essay.

Unit 3- Digital Competence **(18 hrs)**

Listening to interviews (subject related)

Speaking: Interviews with subject specialists (usingvideo conferencing skills)

Creating Vlogs (How to become a vlogger and use vlogging tonurture interests – subject related)

Reading: Selected sample of Web Page (subject area)

Writing: Creating Web Pages

Reading Comprehension: Essay on Digital Competence for Academic and Professional Life.

The essay will address all aspects of digital competence in relation to MS Office and how they can be utilized in relation to work in the subject area

Unit 4 - Creativity and Imagination **(18 hrs)**

Listening to short (2 to 5 minutes) academic videos (prepared by EMRC/ other MOOC videos on Indian academic sites – E.g. https://www.youtube.com/watch?v=tpvicScuDyo)

Speaking: Making oral presentations through short films – subject based

Reading: Essay on Creativity and Imagination (subject based)

Writing – Basic Script Writing for short films (subject based)

- Creating blogs, flyers and brochures (subject based)
- Poster making – writing slogans/captions(subject based)

Unit 5- Workplace Communication& Basics of Academic Writing (18 hrs)

Speaking: Short academic presentation using PowerPoint

Reading & Writing: Product Profiles, Circulars, Minutes of Meeting.

Writing an introduction, paraphrasing

Punctuation(period, question mark, exclamation point, comma, semicolon, colon, dash, hyphen, parentheses, brackets, braces, apostrophe, quotation marks, and ellipsis)

Capitalization (use of upper case)

Outcomes of the Course.

At the end of the course, learners will be able to,

- Attend interviews with boldness and confidence.
- Adapt easily into the workplace context, having become communicatively competent.
- Apply to the Research &Development organisations/ sections in companies and offices with winning proposals.

Instruction to Course Writers:

1. **Acquisition of subject-related vocabulary should not be overlooked**. Textboxes with relevant vocabulary may be strategically placed as a Pre Task or in Summing Up
2. Grammar may be included if the text lends itself to the teaching of a Grammatical item. However, testing and evaluation does not include Grammar.

Third Year | **CORE COURSE V** | **Semester V**

OPTICS

Code | **(Theory)** | **Credit: 5**

COUSE OBJECTIVES:

- To impart knowledge of geometrical optics
- To inculcate the fundamental laws concerning interference, diffraction, polarization and allied phenomena.
- To make the students gain knowledge of basic optical instrumentation

UNIT - I GEOMETRICAL OPTICS:

Spherical aberration - Spherical aberration of a thin and thick lens – Methods of reducing Spherical aberration – Skew rays-Coma – Aplanatic surface – Astigmatism – Curvature of the field – Meniscus lens – Distortion – Chromatic aberration - Chromatic aberration in a lens – Circle of least Chromatic aberration – Achromatic lenses –Computerized lens

UNIT - II INTERFERENCE:

Air wedge – Newton's rings – Haidinger's fringes – Brewster's fringes – Michelson Interferometer and its applications – Fabry- Perot Interferometer – Interference filter – Stationary waves in light – Colour photography (qualitatively) – Holography – Construction and reconstruction of a hologram – Applications.

UNIT - III DIFFRACTION:

Fresnel's diffraction – Diffraction at a (1) circular aperture (2) Straight edge (3) narrow wire – Fraunhofer diffraction at a single slit – Double slit – Missing orders in a Double slit, Diffraction pattern – Grating (theory) – Oblique incidence – Overlapping of spectral lines - 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:

Polarization - Nicol prism – Nicol prism as an analyzer and polarizer – Huygens's explanation of Double refraction in uniaxial crystals – Double Image polarizing prisms – Elliptical and Circularly polarized light – Production and detection – Quarter wave and half wave plates – Babinets compensator – Optical activity – Fresnel's explanation of optical activity – Specific rotation - Laurent's Half shade polarimeter.

UNIT - V OPTICAL INSTRUMENTS AND FIBRE OPTICS:

Microscopes -Simple microscope (magnifying glass) – Eyepieces- Huygens's eyepiece – Ramsden's eyepiece – Telescope. Optical Fibre–Advantages of optical fibre over copper wires - Total internal reflection – propagation of light through an optical fibre - Acceptance angle - Numerical aperture – Types of Optical Fibres based on materials, refractive index and modes of propagation – Fibre optic communication system.

UNIT - VI CURRENT CONTOURS (For continuous internal assessment only):

Fibre optic sensors - Temperature sensors: Intensity modulated sensor, Phase modulated sensor - Displacement sensor – Force sensor –Liquid level detector.

REFERENCES:

1. N. Subrahmanyam Brijlal, M N Avadhanulu, *Optics*,S. Chand Publishing. Pvt. Ltd. New Delhi, 25th revised edition, 2013.
2. Manna Anandamoy Ghosh Krishnapada, *Text book of Physical Optics*, McMillan India Ltd, First edition, 2007.
3. Kiruthiga Sivaprasath, R. Murugeshan, *Optics and Spectroscopy*, S. Chand & Co, 5th edition, 201
4. Singh & Agarwal, *Optics and Atomic Physics*, Pragati Prakashan Meerut, Nineth edition, 2002.
5. A.B. Gupta, *Modern Optics*, Books and Allied (P) Ltd, Kolkata, 5thedition, 2021.
6. AjoyGhatak, *Optics*, McGraw Hill, New Delhi, 7th edition, 2020.
7. Arial Lipson, Stephen G. Lipson and Hentry Lipson, *Optical Physics*, Cambridge University Press, 4thedition, 2011.
8. Hect Eugene, Schaum's Outlines, *Optics*, Tata McGraw Hill, 2011.
9. R.S. Longhurst, *Geometrical and Physical Optics*, Longman Group Ltd, UK, Third edition,1999

COURSE OUTCOMES:

Upon completion of this course, the students would be able to

- Understand the geometrical optics
- Get the knowledge about interference and holography
- Acquire the theoretical aspects of diffraction and familiarize grating
- Grasp the fundamentals of polarization and its classification
- Understand the working principles of optical instruments like microscopes, telescopes and refract meters, etc.

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Third Year **CORE COURSE VI** **Semester V**

ATOMIC AND MOLECULAR PHYSICS

Code **(Theory)** **Credit: 5**

COURSE OBJECTIVES:

- To familiarize the constituents of the atom, atomic models, the impact of magnetic and electric fields on spectra.
- To provide the necessary knowledge of the concepts of photoelectric cells.
- To provide the knowledge of molecular spectra and molecular orbital theories

UNIT – I CATHODE AND POSITIVE RAY – ANALYSIS:

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

UNIT – II Atom Model:

Introduction– Vectoratommodel - Quantum numbers- Pauli's exclusion principle - Magnetic dipole moment due to orbital motion and spin of the electron –The Stern and Gerlach experiment – Zeeman effect –Experimental arrangement for the normal Zeeman effect - Larmor's theorem - Quantum mechanical explanation of the normal Zeeman effect-Anomalous Zeeman effect-Paschen Back Effect –Stark effect.

UNIT – III FREE ELECTRON THEORY OF METALS AND PHOTOELECTRIC EFFECT:

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 investigation son the photoelectric effect-Laws of photoelectric emission - Einstein's photoelectric equation – Experimental verification - Millikan's experiment – Photoelectric cells – Photo emissive cell – Photovoltaic cell – Photoconductive cell-Applications of Photoelectric cells.

UNIT – IV MOLECULAR PHYSICS:

Molecular spectra – Theory of the pure rotational spectrum of a molecule - Theory of the origin of vibration -rotationspectrumofamolecule-Electronicspectraofmolecules-Molecular orbital theory of Hydrogen molecule ion – Heitler-London theory of Hydrogen molecule.

UNIT – V MOLECULAR ORBITALS:

Molecular Orbitals – Introduction – Linear Combination of Atomic Orbitals (LCAO) – Proper overlap between atomic orbitals – Molecular Orbital Theory – Introduction –Postulates – Types of molecular orbitals – Formation of molecular orbitals – Characterization of molecular orbitals – Features of molecular orbitals.

UNIT – VI CURRENT CONTOURS (For internal continuous assessment only):

Cold Atoms – Cold Molecules – Quantum Optics– Ultra fast Phenomena – Quantum Simulation – Atom interferometer and its applications – Molecular aspects of Cold Chemistry.

REFERENCES:

1. R. Murugesan, Kiruthiga Sivaprasath, *Modern Physics*, S. Chand & Co Ltd., New Delhi, 14th revised edition, 2016.
2. J.B. Rajam, *Atomic Physics*, S. Chand & Co Ltd., New Delhi, Revised edition, 2009.
3. S.N. Ghoshal, *Atomic Physics*, S. Chand & Co Ltd., New Delhi, Revised Edition, 2010.
4. N. Subrahmanyam, BrijLal, Jivan Seshan, Atomic and Nuclear Physics, S. Chand Publishing, 2008.
5. Puri, Sharma, Pathania, *Principles of Physical Chemistry*, Vishal Publications, 47 Edition, 2021.
6. Sehgal, Chopra and Sehgal, *Modern physics*, Sultan Chand & Sons, New Delhi, 2004.
7. Arthur Beiser, Shobhit Mahajan, S.RaiChoudhury, *Concepts of Modern Physics*, Sixth edition, SIE, 2009.
8. Robert L Brooks , *The Fundamentals of Atomic and Molecular Physics*, Springer, New York, 2014.
9. Dr. P.S Tambade, Dr. S.D. Aghav, Dr. G.R. Pansare, B.M. Laware, V.K.Dhas, Dr. B.G. Wagh, *Atomic and Molecular Physics*, Nirali Prakashan, Pune, India, 2018.
10. Christopher J. Foot, *Atomic Physics,* Oxford University Press, New York, 2005.
11. Peter W. Atkins, Ronald S. Friedman, Molecular Quantum Mechanics, Oxford University Press, Oxford, 2011.
12. https://www.pdfdrive.com/atomic-
13. https://content.kopykitab.com
14. https://collegedunia.com
15. http://chem.libretexts.org

COURSE OUTCOMES:

Upon completion of this course, the student would be able to:

- Learn about the elements that made up an atom.
- Acquire the knowledge of underpinning atomic models and the impact of magnetic and electric fields on spectra.
- Communicate the concept of photoelectric cells.
- Enhance the knowledge of molecular spectra
- Provide a detailed study of molecular orbital theories.

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Third Year	**CORE COURSE VII**	**Semester V**
	ELECTRONICS	
Code	**(Theory)**	**Credit: 5**

COURSE OBJECTIVES:

- To provide the knowledge of intrinsic, extrinsic semiconductors and transistor circuit configuration
- To inculcate the digital electronic concepts required to analyse and design digital electronic circuits and systems.
- To impart knowledge of various number systems, data representation, logical circuits and their implementation, combinational, sequential digital systems and operational amplifiers.

UNIT – I SEMICONDUCTOR DIODES AND BIPOLAR TRANSISTORS:

Intrinsic and extrinsic semiconductors –PN junction diode – Biasing–V-I Characteristics– Rectifiers – Half wave – full wave and Bridge rectifiers – Break down mechanisms – Zener diode- Characteristics of Zener diode – Zener diode as voltage regulator-Bipolar junction transistor – Basic configurations -Relation between α and β – Characteristics of a transistor – CB and CE configuration.

UNIT – II AMPLIFIERS AND OSCILLATORS:

Single stage CE amplifier – Analysis of hybrid equivalent circuit – Power amplifiers – Efficiency of class A,B& C Power amplifier - General theory of feedback – Properties of negative feedback – Criterion for oscillations – Hartley oscillator – Colpitt's oscillator.

UNIT – III NUMBER SYSTEMS, LOGIC GATES AND BOOLEAN ALGEBRA:

Number Systems: 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 (minterms) – Karnaugh map simplification (Four variables).

UNIT – IV COMBINATIONAL AND SEQUENTIAL DIGITAL SYSTEMS:

Combinational Digital Systems- Half and full adders – Half and full subtractors – Decoder(2:4 line) – Encoder(4:2 line)– Multiplexer(4:1 line) – Demultiplexer (1:4 line) – Sequential Digital Systems 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 - Shift registers – SISO and SIPO shift registers.

UNIT – V OPERATIONAL AMPLIFIER:

Operational amplifier - Characteristics of an ideal op-amp – Inverting and Non-inverting amplifier – Voltage follower – Adder, Subtractor, Integrator and Differentiator circuits – Log and antilog amplifiers.

UNIT – VI CURRENT CONTOURS (For Continuous internal assessment only):

4-bit parallel binary adder and subtractor – BCD adder – instrumentation amplifier – Karnaugh map reduction and logic circuit implementation.

REFERENCES:

1. Mehta V.K., *Principles of Electronics*, S. Chand and company Ltd, 2014.
2. A.P. Malvino, D.P. Leach, *Digital Principles and Application*, IV Edition, Tata McGraw Hill, New Delhi, 2011.
3. V. Vijayendran, *Digital Fundamentals*, S. Viswanathan (Printers & Publishers) Private Ltd, Chennai, 2014.
4. Theraja. B.L, *Basic electronics - Solid State*, S.Chand and Company Ltd 2002.
5. Sedha R.S., *A text book of applied Electronics*, S.Chand & company Ltd 2002.
6. W.H.Gothmann, *Digital Electronics*, Prentice Hall of India, Pvt. Ltd., New Delhi 1996.
7. Mehta V.K., Rohit Mehta, *Principles of Electronics*, S. Chand and company Ltd, Revised edition 2010, ISBN 81-219-2450-2.
8. Ben G. Streetman, Sanjay Banerjee, *Solid state electronic device,* Pearson Education (pvt.Ltd.,) NewDelhi, India, fifth edition 2004.
9. Chattopadhyay T., *Advanced Electronics*, CBS publisher, ISBN -978-9390709007, 2021
10. Ganguly, Partha Kumar, *Principles of Electronics,* PHI Learning Pvt. Ltd., 2015.
11. D. H. Horrocks, *Feedback circuits and Op. Amps*, Springer Science & Business Media, 2013.
12. https://www.youtube.com/watch?v=_dQ3OdbyDMk
13. https://nptel.ac.in/courses/108105113
14. https://nptel.ac.in/courses/108101091
15. https://nptel.ac.in/courses/108102145
16. https://www.classcentral.com/course/youtube-digital-electronics-48205
17. https://www.youtube.com/watch?v=DBTna2ydmC0
18. https://nptel.ac.in/courses/108105132
19. https://www.youtube.com/watch?v=kiiA6WTCQn0
20. https://www.youtube.com/watch?v=kbVqTMy8HMg

COURSE OUTCOMES:

On completion of the course the students will be able to:

- Understand the fundamental principles of semiconductors including p-n junctions and zener diode
- Analyze the characteristics of transistor and transistor biasing circuits
- Perform conversion between various number systems.
- Apply knowledge of Boolean algebra and other minimization techniques for digital circuit design.
- Identify, formulate and solve problems based on combinational circuits
- Verify the functions of various digital integrated circuits.
- Carry outthe project using digital integrated circuit

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Third Year | **CORE PRACTICAL V** | **Semester V**

OPTICS AND DIGITAL ELECTRONICS

Code | **(Practical)** | **Credit: 4**

(ANY EIGHT EXPERIMENTS)

COURSE OBJECTIVES:

To ignite the minds of the learners with the practical knowledge of Physics by enhancing the hidden talents in troubleshooting experiments.

EXPERIMENTS:

1. B.G. – Absolute capacity of a condenser.
2. Spectrometer – Grating – Minimum deviation position.
3. Spectrometer – Dispersive power of a grating.
4. Construction and study of a Full Wave Rectifier.
5. Transistor characteristics – CE configuration.
6. FET characteristics.
7. Single-stage RC coupled amplifier – Transistor.
8. AND, OR and NOT Gates – Discrete components.
9. AND, OR and NOT Gates – Using ICs
10. Realizing NOR gate as a Universal gate.
11. Realizing NAND gate as a Universal gate.
12. OP-AMP - Adder and Subtractor

REFERENCES:

1. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli 2009
2. Dr.S.Somasundaram, *Practical Physics*, Apsara publications, Tiruchirapalli, 2012.
3. C.C. Ouseph, U.J. Rao and V. Vijayendran, *Practical Physics and Electronics,* Viswanathan Printers and Publishers, PVT Ltd (www.svprinters.com), Chetpet, Chennai-2014
4. S. Srinivasan, *A Text Book of Practical Physics*, S. Sultan Chand Publications. 2005
5. R. Sasikumar, *Practical Physics*, PHI Learning Pvt. Ltd, New Delhi, 2011.

COURSE OUTCOME:

On completion of the course the learner will be able to:

- Understand the characteristics of electronic components.
- Evaluate a process based on the results obtained from the experiments quantitatively and qualitatively.
- Obtain the scope of the investigation as expected.
- Link a process with help of the outcomes of an experiment.
- Develop the skill of experimenting collaboratively and ethically.

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Third Year **MAJOR BASED ELECTIVE I** **Semester V**

1) SOLID STATE PHYSICS

Code **(Theory)** **Credit: 4**

COURSE OBJECTIVES:

- To impart the knowledge of crystallography.
- To introduce the basic ideas of bonding and defects in solids
- To make the students understand the properties of metals and semiconductors
- To inculcate the knowledge of dielectric, magnetic and superconducting properties of materials.

UNIT – I CRYSTAL SYSTEMS:

Basic concepts of crystal –Lattice – Basis – Crystal structure - Unit cell – primitive cell-lattice parameters – crystal systems – Bravais lattices – SC, BCC, FCC, HCP crystal structures –number of atoms in unit cell- atomic radius-coordination number - packing fraction- crystal planes – Miller indices- Bragg's law-crystal structure analysis-Laue's photographic method-Powder crystal diffraction method.

UNIT– II BONDING AND DEFECTS IN SOLIDS:

Interatomic forces – Bonding in solids – Primary bonds – Ionic, Covalent and metallic bonds – Secondary bonds – Dipole, dispersion and hydrogen bonds.
Defects in solids – point defects: vacancy, interstitials, impurity – Line defects: Edge dislocation, screw dislocation –Surface defects: Grain boundary, stacking faults-volume defects.

UNIT– III ELECTRON THEORY OF METALS AND SEMICONDUCTORS:

Classical free electron theory of metals- – Electrical and Thermal conductivity-Wiedemann Franz law – Quantum free electron theory –Fermi energy- density of states – Band theory of solids – Brillouin zones. Semiconductors – carrier concentration of intrinsic-electrical conductivity- carrier concentration of P-type and n-type – Hall Effect – experimental determination of carrier concentration and mobility – application.

UNIT– IV DIELECTRIC AND MAGNETIC PROPERTIES:

Dielectrics: – polarization — dielectric constant- types of polarization – Lorentz field (derivation) – Clausius - Mossotti relation – Properties of dielectric materials – Dielectric loss and breakdown. Magnetism:dia, para, ferro, antiferro and ferri-magnetism – Ferromagnetic domains- Anti ferromagnetic materials – Ferrimagnetic materials.

UNIT– V SUPER CONDUCTIVITY:

Introduction – Historical developments – General properties of superconductivity - Critical field and Crystal temperature – Meissner effect — Type I and Type II superconductors – London equations - penetration depth - Isotope effect– BCS theory – Applications of superconductors.

UNIT – VI CURRENT CONTOURS (For Continuous internal assessment only):

Smart Materials

Introduction to smart materials – Components of smart materials – Classification of smart materials – Shape memory alloys – Applications of smart materials.

REFERENCES:

1. *Solid State Physics* – N. Singh, Wiley India, ISBN: 978-9390455249, 2021
2. *Solid State Physics* – Gupta & Kumar, K. Nath & Co, Meerut,2000.
3. *Solid State Physics* – Singhal, Kedarnath Ramnath & Co,Meerut,2005.
4. *Material Science* – M.Arumugam, Anuratha Agencies, 2002.
5. *Materials Science* – S. L. Kakani and AmitKakani, 3rd Edition, New Age International, 2016
6. *Introduction to Solid State Physics* – Charles Kittel, John Wiley, 2004.
7. *Elementary Solid State Physics* – Ali Omar, Addison Wesley Publishing Company, 1975.
8. *Elements of Solid State Physics* – J.P. Srivastava, Second Edition, PHI learning Pvt. Ltd., 2006.
9. *Solid State Physics and Electronics* – A.B. Gupta & NurulIslam, Books & Allied Ltd, 2012 ISBN: 978-8187134831
10. *Solid State Physics* - V. K. Dhas Dr. S. D. Aghav, B. M. Laware, Dr. P. S. Tambade, Nirali Prakashan Publishers, 2019.

COURSE OUTCOME:

Upon completion of this course, students would be able to

- To find the crystal structure of materials applying their learnt knowledge.
- To differentiate the bonding in solids and identify the defects prevalent in crystalline solids
- To apply the gained knowledge about theories on conductors and semiconductors for learning related advanced topics
- To analyze the dielectric and magnetic various materials.
- To review the peculiar properties of superconducting materials and their implications.

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Third Year **MAJOR BASED ELECTIVE I** **Semester V**

2) LASER PHYSICS

Code **(Theory)** **Credit: 4**

COURSE OBJECTIVES:

- To provide knowledge of the principle and characteristic features of lasers.
- To impart the concepts of the transient operations
- To make the students acquire knowledge of the working principles of different types of Lasers
- To inculcate the Industrial and Medical applications of lasers
- To transfer the knowledge about the holography and its applications

UNIT – I FUNDAMENTALS OF LASER:

Introduction to LASER - Principle – Characteristics of LASER – Einstein's co-efficient - Derivation - Population Inversion - Pumping action - Optical resonator- different configurations of optical resonators – Stability condition (no derivation required) and stability diagrams for optical resonators

UNIT – II TRANSIENT EFFECT:

Transverse and longitudinal mode selection- Principle of Q- switching and Mode locking – Different types of Q- switching: Electro-optic Q- switching and Pockel's cell.

UNIT – III LASER SYSTEMS:

Ruby LASER – Nd-YAG LASER– He-Ne LASER - CO2 LASER - Dye LASER - Semiconductor LASER: - Homo junction and Hetero junction.

UNIT – IV APPLICATIONS OF LASERS:

Material processing: Welding, Drilling, Cutting and Heat treatment – Medical: Surgery – Ophthalmology – Dermatology –Endoscope - Communication: LIDAR – LASER in Fibre Optics – Optical waveguides and sensors – Laser safety precautions

UNIT – V HOLOGRAPHY:

Introduction – Principle of Holography – Co axial Holography – Off – axis Holography – Holograms – Important Properties of Hologram – Classification of Holograms applications – Medical applications of Holography.

UNIT – VI CURRENT CONTOURS (For Continuous internal assessment only):

Atom laser: Bose-Einstein condensation – Methods of cooling atoms – Laser doppler cooling - Basic atom Laser –Atom laser applications.

REFERENCES:

1. N. Subrahmanyam Brijlal, M N Avadhanulu, *Optics*, S. Chand Publishing. Pvt. Ltd. New Delhi, 25th revised edition, 2013.
2. B. B. Laud, *Lasers and nonlinear optics* – Wiley Eastern Ltd., (1985)
3. K. Thiyagarajan and A. K. Ghatak, *LASERS: Theory and* Ap*plications* – Macmillan India Ltd.
4. A. Sundaravelusamy, *Applied Physics II,* Priya publications, Revised edition 2015.
5. A.K. Pandey, C. K. Pandey and Manisha Bajpai, Fundamentals of LASER Systems and Applications, Wiley publisher, 1st Edition, 2017, ISBN: 9788126568260, 8126568269.
6. William Silfvast, *Laser Fundamentals*, Cambridge press, 2004
7. O. Svelto,*Principles of lasers*, 5th Edition 2010, SPRINGER
8. A.E Siegman, *Lasers*, University Science Books, California, 1986
9. Peter W. Milonni, Joseph H. Eberly, *Laser Physics*, John Wiley & Sons, 2010.
10. Orazio Svelto, *Principles of Lasers,* Springer Science & Business Media, 2013.
11. Karl F. Renk, Basics of Laser Physics, Springer, 2017
12. Kusam Devgan, SurinderKaur, *Quantum and Laser Physics,* Newrays Publishing House, 2021
13. https://ebook-new.com/gets/book.php?id=dpVDTLPySTQC&item=basics-of-laser-physics&data=bookarchive.net
14. https://ebook-new.com/gets/book.php?id=z13wEOBwn1wC&item=lasers&data=bookarc
15. http://www.youtube.com/c/IIT
16. http://www.youtube.com/c/Nanotechnology

COURSE OUTCOMES:

Upon successful completion of this course, the students would be able to:

- Recall the basic light matter interaction, characteristics of atomic transitions
- Analyze the different types of lasers and their features
- Apply the working principle to produce different types of Lasers
- Describe how the Lasers can be used in various Industries and Medicine
- Adapt appropriate safety measures when handling laser experiments.

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Third Year **SKILL BASED ELECTIVE I** **Semester V**

ELECTRICAL WIRING FUNDAMENTALS

Code **(Theory)** **Credit: 2**

COURSE OBJECTIVES:

- To impart the knowledge about generation of Electricity.
- To provide knowledge of AC, DC, types of electrical circuits, transformers etc.
- To develop skills on electrical wiring.

UNIT – I GENERATION OF ELECTRICITY:

Conventional methods of power generations – Thermal power plant – Atomic power station – Solar energy – wind mill energy.

UNIT – II FUNDAMENTALS OF ELECTRICITY:

Electron theory – Flow of electrons and current – Resistance - Electromotive Force - voltage – potential difference – voltage drop – alternating current – direct current – Ohm's law – Effects of electric current – Types of electrical circuits – work, power and energy.

UNIT – III SINGLE PHASE AND POLYPHASE AC CIRCUITS:

Alternating current – amplitude – time period – frequency – RMS value – polyphase – 2 phase – 3 phase – advantage of polyphase over single phase – star connection – delta connection.

UNIT – IV TRANSFORMER:

Construction – principle of operation – classification of transformers – types of core – Transformer losses – Efficiency – Alternator – Parts of an alternator – AC three phase motors – AC single phase motors.

UNIT – V HOUSE WIRING:

Earthing – Necessity of earthing – Types of earthing – safety fuse – circuit breaker – thermal fuses – Toggle switch – keyboard switches – wires and cables – connectors.

REFERENCES:

1. Electrical power – Dr. S. L. Uppal.
2. Basic Electrical Engineering – M. L. Anwani.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

- Distinguish various types of electrical components
- Recall the basic principles of electrical wiring
- Identify and rectify the defects in simple electrical circuits.
- Do electrical wiring.

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Third Year **CORE COURSE VIII** **Semester VI**

NUCLEAR PHYSICS

Code **(Theory)** **Credit: 5**

COURSE OBJECTIVES:

- To introduce basic concepts and properties of the atomic nucleus.
- To impart knowledge of radioactivity and related phenomena.
- To inculcate various interactions of nuclear radiation with matter.
- To make the students understand the fission and fusion reactions and their applications.
- To emphasize the understanding of nuclear forces, nuclear models, elementary particles and accelerators.

UNIT – I GENERAL PROPERTIES OF NUCLEI & NUCLEAR FORCES:

Classification of nuclei – General properties of nucleus–determination of nuclear size – electron scattering experiment –Dempster's mass spectrograph – binding energy, mass defect and packing fraction – stability and binding energy curve – Semi-empirical mass formula – Nuclear spin and magnetic moment – Electric quadruple moment – Nuclear forces – basic properties- Meson theory of Nuclear forces.

UNIT – II RADIOACTIVITY:

Laws of Natural radioactivity – Law of radioactive disintegration – Half life period – Mean life period – Law of successive disintegration – Radioactive Equilibrium – Types of radioactive radiations –Properties – Alpha emission –Geiger and Nuttal law – Alpha particle spectra – Theory of alpha decay –Gamow's theory – Beta ray spectra – line and continuous spectrum – Neutrino theory – Gamma raysspectra – origin of Gamma rays – Nuclear isomerism – Internal conversion.

UNIT – III NUCLEAR REACTIONS:

General ideas of nuclear reactions –types of Nuclear reactions – energy balance in nuclear reaction – threshold energy – nuclear transmutations – types of transmutations with examples – discovery of neutron – properties -Nuclear models: liquid drop model – shell model - fission – fusion.

UNIT – IV DETECTORS AND ACCELERATORS:

Solid state detectors – Geiger-Muller counter – Wilson-cloud chamber – Bubble chamber –Scintillation counters – Cerenkov counter – Linear accelerator – Cyclotron – Synchrocyclotron – Betatron – Electron synchrotron – Proton synchrotron.

UNIT – V COMIC RAYS AND ELEMENTARY PARTICLES:

Discovery of Cosmic rays – Latitude effect – Azimuth effect – Altitude effect – Primary and Secondary cosmic rays – cosmic ray showers – Van Allen belts – Origin of cosmic rays – Elementary particles: classification – Particles and antiparticles – fundamental interactions – elementary particle quantum numbers – conservation laws and symmetry.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only):

Radiation monitoring – Dosimeters – Biological effects of radiation –Penetration and ionizing power of nuclear radiation in human body – Nuclear power plants in India

REFERENCES:

1. R. Murugesan, S. Kiruthiga, *Modern Physics,* S. Chand Company Ltd. Revised edition (2006).
2. M.L. Pandya, R.P.S. Yadav, Amiya Dash, *Elements of Nuclear Physics*, KedaarNath& Ram Nath (2000).
3. Satya Prakash*, Nuclear Physics*, A Pragati Prakasan Publication (2011).
4. Vimal Kumar Jain, *Nuclear and Particle Physics,* Ane Books (2016)
5. N. Subrahmanyam BrijLal, Jivan Seshan, *Atomic and Nuclear Physics*, S. Chand; Reprint Edn. (2006) edition.
6. Gupta & Roy., *Physics of the Nucleus*, Books and Allied (P) Ltd. Kolkatta (2011).
7. S. N. Ghoshal, *Nuclear Physics (Revised Edition)*, S. Chand & Company PVT, LTD, New Delhi (2016).
8. S. B. Patel, *Nuclear Physics: An Introduction,* New AGE (2020)
9. W. J. Price, *Nuclear Radiation Detectors*, McGraw-Hill
10. D. C. Tayal, *Nuclear Physics,* Himalaya Publishing House, (2009).
11. https://onlinebooks.library.upenn.edu/webbin/book/lookupid?key=olbp75446)

COURSE OUTCOMES:

Upon completion of this course, students would be able to

- Gather advanced knowledge in nuclear physics.
- Explain the general properties of the nucleus, shell model and collective model
- Gain knowledge to explain the radioactive decays and apply various aspects of nuclear reactions in view of compound nuclear dynamics.
- Describe the working principles of nuclear detectors and accelerators
- To explain the nuclear fusion, nuclear fission reaction and elementary particles.

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Third Year **CORE COURSE IX** **Semester VI**

THEORETICAL PHYSICS

Code **(Theory)** **Credit: 5**

COURSE OBJECTIVES:

- To give an exposure to advanced topics in Physics and to learn the basis of fundamental principles and the Lagrangian formulation.
- To enhance students understanding about relativity.
- To build a strong base on the foundation of Quantum Mechanics.
- To get acquainted with problem solving skills in the basic aspects of Lagrangian Mechanics, relativity and foundation of Quantum mechanics.
- To provide a basic knowledge in the topic Universe.

UNIT – 1 FUNDAMENTAL PRINCIPLES AND LAGRANGIAN FORMULATION:

Mechanics of a particle and system of particles – Conservation laws - Constraints – Generalized coordinates – Principle of virtual work – D' Alembert's principle and Lagrange's equation – Hamilton's principle – Lagrange's equation of motion – Simple pendulum – Atwood's machine – Conservation theorem and symmetry properties.

UNIT – II RELATIVISTIC DYNAMICS:

Lorentz Scalars and Lorentz Vectors – Relativistic Linear Momentum and Energy – Energy and Linear momentum of subatomic Particles – Conservation Laws and Transformation Rules for Energy and Linear Momentum – Photons and Doppler Shift - Relativity and Subatomic Particles; Relativistic Collisions and Decay – Mass to Energy Conversion.

UNIT – III DUAL NATURE OF MATTER:

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 – Heisenberg's uncertainty principle.

UNIT – IV BASICS OF QUANTUM MECHANICS:

Basic postulates of wave mechanics – Development of Schrödinger wave equation – Time independent and dependent forms of equation – Properties of wave function – Orthogonal and normalized wave function and eigenvalues – Expectation values and Ehrenfest's theorem – Particle in a box.

UNIT – V THE UNIVERSE:

Introduction –Galaxy - Milky way galaxy - Structure of the Sun – Temperature of the Sun – The Earth-Moon system – Composition of Earth's internal shells and Earth's

magnetic field – Neutron stars – Pulsars – Black Holes – The origin of the Universe (Big Bang Theory) – Stellar evolution – Proton-proton cycle.

UNIT – VI CURRENT CONTOURS (For Continuous internal assessment only):

Quantum sensors – Quantum sensing for gravity cartography – Quantum based search for dark matter – Relativistic astrophysics.

REFERENCES:

1. S. I. Gupta, V. Kumar and Hv. Sharma, *Classical Mechanics* (Pragati Prakashan, Meerut, 2019).
2. J. C. Upadhyaya, *Classical Mechanics* (Himalaya Publishing House, Bangaluru, 2019).
3. G. Aruldas, *Quantum Mechanics* (PHI Learning Pvt. Ltd., New Delhi, 2008).
4. A. K. Saxena, *Principle of modern physics* (Narosa, New Delhi, 2014).
5. R. Murugesan, KiruthigaSivaprasath, *Modern Physics* (S. Chand, 2006).
6. H. Goldstein, C. P. Poole and J. Safko, *Classical Mechanics* (Pearson, London, UK, 2019).
7. N. C. Rana and P. S. Joag, *Classical Mechanics* (Tata McGraw-Hill, New Delhi, 2017).
8. N. Zettili, *Quantum Mechanics* (Wiley Pvt. Ltd., India, 2016).
9. L. D. Landau and E. M. Lifshitz, *Mechanics* (Elsevier, India, 2010).
10. Georg Joos, Ira M. Freeman, *Theoretical Physics,* (Dover Publications; 3rd Revised ed. edition 2013).
11. https://Theoretical-Physics-1-Classical-Mechanics-ebook/dp/B01HPHM7HE
12. https://Theoretical-Physics-Dover-Books-ebook/dp/B00C8UR0B2

COURSE OUTCOMES:

Upon completion of this course, Students would be able to

- Grown familiarity with the foundation of Classical Mechanics.
- Develop problem solving skills in Mechanics.
- Understand the basic formalism of Quantum Mechanics.
- Understand mathematical implication in Physics.
- Acquire basic knowledge about our Universe.

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Third Year **CORE PRACTICAL VI** **Semester VI**

ELECTRONICS, MICROPROCESSOR AND PROGRAMMING

Code **(Practical)** **Credit: 4**

COURSE OBJECTIVE:

- To improvise the knowledge on utilization of electronic devices in electrical appliances by performing some experiments and executing programmes in order to realize the applications of microprocessors and computers.

EXPERIMENTS:

SECTION A
(ANY FOUR EXPERIMENTS)

1. Construction of a regulated power supply using Zener diode – Percentage of regulation.
2. Hartley oscillator using Transistor.
3. OP-AMP –Integrator and Differentiator.
4. Half adder and full adder using basic and EX-OR gates.
5. Half subtractor and full subtractor using basic and EX-OR gates.
6. Verification of Boolean laws (Any four).

SECTION B - MICROPROCESSOR 8085
(ANY TWO EXPERIMENTS)

1. 8 – bit addition and 8 – bit subtraction.
2. 8 – bit multiplication and 8 – bit division.
3. Finding the larger and the smaller number in a data array.
4. Block data transfer.

SECTION C - COMPUTER PROGRAMMING IN C
(ANYTWO EXPERIMENTS)

1. Conversion from Centigrade to Fahrenheit.
2. Calculation of volume of Sphere, Cone, Cube and Cuboid.
3. Sum of series of numbers of a given array.
4. Finding the average of the set of numbers in an array.

REFERENCES:

1. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli 2009
2. Dr. S. Somasundaram, *Practical Physics*, Apsara Publications, Tiruchirapalli, 2012.

3. C.C. Ouseph, U.J. Rao and V. Vijayendran, *Practical Physics and Electronics*, Viswanathan Printers and Publishers, PVT Ltd (www.svprinters.com), Chetpet, Chennai - 2014
4. S. Srinivasan, *A Text Book of Practical Physics*, S. Sultan Chand publications. 2005
5. R. Sasikumar, *Practical Physics*, PHI Learning Pvt. Ltd, New Delhi, 2011.

COURSE OUTCOMES:

On completion of the course, the learner will be able to:

- Perform few technical operations with electronic equipments.
- Understand the use of electronic components in Digital computers.
- Acquire the skill of verifying laws in Physics through experiments.
- Realize the applications of electronic devices.
- Acquire the skill of applying the developed software for some scientific and industrial applications.

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Third Year **MAJOR BASED ELECTIVE II** **Semester VI**

1) MICROPROCESSOR AND C PROGRAMMING

Code **(Theory)** **Credit: 4**

COURSE OBJECTIVES:

The purpose of this course is to introduce students about the key features and implementation of C language and 8085 Microprocessor ALP.

- To introduce algorithms and flowcharts for language independent programming logic development.
- To provide fundamental knowledge on the Architecture and Instruction Set of8085.
- To impart the various features and components of C program writing.

UNIT – I BASICS OF DIGITAL COMPUTER, INTEL 8085 MICROPROCESSOR ARCHITECTURE AND INSTRUCTIONS

Basic components of digital computer - Semiconductor memories – Hardware and Software –History of microprocessors - INTEL 8085 - Pin Diagram - Architecture - Various registers - Status Flags - 8085 Instructions: Machine Language, Assembly Language, Instruction Set and Format - Data Transfer, Arithmetic, Logical, Branching and Machine Control Operations - Addressing Modes: Register, Implied, Immediate, Direct and indirect addressing.

UNIT – II ASSEMBLY LANGUAGE PROGRAMMING:

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-complement – shift – mask-look up table– multibyte addition and subtraction –decimal addition - subtraction.

UNIT – III ESSENTIALS OF C LANGUAGE:

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– Arithmetic Expressions – Mathematical functions.

UNIT – IV I/O FUNCTIONS AND CONTROL STATEMENTS:

Data input and output: getchar, putchar, scanf, printf functions - Decision making and branching : simple if - if…else - else if ladder – switch – break - continue -goto – Looping : while - do… while - for - nested loops.

UNIT – V ARRAYS AND C LANGUAGE PROGRAMMING:

Introduction to Arrays – Declaration - Initialization — One dimensional array —Two dimensional arrays – Library functions.

C Language Programming:

1. Conversion of Centigrade into Fahrenheit.
2. Calculation of volume of sphere/cone/cube/rectangular cuboid.
3. Solving quadratic equation.
4. Sum of digits of a series
5. Finding the largest and smallest number in a data array
6. Arranging numbers in ascending order/descending order.
7. Matrix arithmetic operation (Addition/Subtraction/Multiplication)

UNIT – VI CURRENT CONTOURS: (For continuous internal assessment only):

Introduction to functions - Function Declaration -Function definition -Function call – Recursion -Structures – Unions.

REFERENCES:

1. B. Ram – *Fundamentals of Microprocessors and Microcontrollers*–DhanpatRai Publications (P) Ltd., New Delhi, 2013.
2. E. Balagurusamy – *Programming in ANSI C* – Tata McGraw Hill Education Private Limited, New Delhi,2018.
3. YashavantKanetkar, *Let us C,* BPB Publications, Fifteenth edition 2017.
4. Carl Hamacher, ZvonkoVranesic, SafwatZaky*Computer Organization*, McGraw-Hill, Fifth Edition, Reprint 2017
5. R. S.Gaonkar- *Microprocessor Architecture, Programming, and Applications with the 8085*, Penram International Publishing (India) Private Limited, Mumbai,2007.
6. Dr D A Godse and A P Godse, *Microprocessors & Introduction to Microcontroller: 8085, 8086, 8051 - Architecture, Interfacing and Programming,* Technical Publications, 2020
7. K. R. Venugopal and S. R. Prasad – *Programming with C* – Tata McGraw-Hill Publishing Company Limited, New Delhi, 2002.
8. *Advance Microprocessor*, DenielTabak, TMH.
9. IBM PC *Assembly Language & Programming*, Peter Abel, PHI.
10. S. Palaniswamy, *Physics through C- Programming*, A Pragati Edition, 2004.
11. https://www.youtube.com/watch?v=4pTiujyY4IM
12. https://www.youtube.com/watch?v=zAXAb_ttazY
13. https://nptel.ac.in/courses/106106210
14. https://nptel.ac.in/courses/108105102
15. https://archive.nptel.ac.in/courses/106/104/106104128/

COURSE OUTCOMES:

Upon completion of this course, the students would be able to:

- Study of the basic structure and operation of a digital computer system.
- Describe architecture of 8085 processors.
- Write, compile and debug programs in assembly language
- Develop algorithms for arithmetic and logical problems and write programs in Assembly and C language.
- Design programs involving decision structures, loops, and arrays.
- Create and perform different Programs.

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Third Year **MAJOR BASED ELECTIVE II** **Semester VI**

2) NANOTECHNOLOGY

Code **(Theory)** **Credit: 4**

COURSE OBJECTIVES:

- To introduce basics of nanoscience, nanomaterials and nanotechnology.
- To impart the knowledge of nanomaterials preparation methods
- To make the students learn the characterization techniques for analysing the properties of nanomaterials and applications of nanomaterials.

UNIT– I INTRODUCTION TO NANOTECHNOLOGY:

Nanoscience – Nanotechnology – Definitions - History of nanotechnology – Nanomaterials: classification – Zero, one and two dimensional nanomaterials – Properties of nanomaterials– Surface area to volume ratio (S.A/V) – Effect of S.A/V on the properties of materials –Quantum dots– Production of quantum dots – Applications of quantum dots– Quantum wires –properties and applications of quantum wires-Challenges in nanotechnology.

UNIT – II PREPARATION METHODS:

Top-down and Bottom-up approaches–Top-down methods: Ball milling, Chemical etching photolithography and Electron beam lithography –Advantages– Limitations. Bottom-up methods: Vacuum evaporation, Sputter deposition process, Laser ablation, Hydrothermal method – Advantages– Limitations.

UNIT– III FULLERENES:

Fullerenes–Types of fullerenes–Bucky ball/Buckminster fullerene-Carbon nano tubes (CNTs) - Single walled CNTs – Multi walled CNTs – Differences – Properties of CNTs: mechanical, electrical and superconducting properties – Preparation of CNTs – Plasma discharge method – Chemical vapour deposition method – Applications.

UNIT–IV CHARACTERIZATION TECHNIQUES:

Construction, working principle, merits and demerits of X-ray diffractometer-Scanning Electron Microscope (SEM) – Atomic Force Microscope (AFM) – UV-Vis–NIR double beam spectrophotometer– Energy dispersive X-ray analysis (EDAX)- SQUID – Raman spectroscopy.

UNIT– V APPLICATIONS:

Nanoelectronics – Molecular electronics – Nanophotonics – Nanorobotics – Nanomechanics –Carbon nanotubes FETs–Nano MOSFETs – Molecular diodes and transistors – Biomedical applications: Targeted drug delivery –targeted chemotherapy.

UNIT – VI CURRENT CONTOURS (For continuous internal assessment only):

Bandgap engineered quantum devices – Quantum computers– Nanomaterials in environmental applications – Nanomaterials in energy

REFERENCES:

1. K. Ravichandran, K. Swaminathan, P. K. Praseetha, P. Kavitha, *Introduction to Nanotechnology*, JAZYM publications, 2019 ISBN 978-93-87360-40-2
2. M. Ratner et. al., *Nanotechnology*; A Gentle intro Practices–hall, 2002, ISBN 0-13-101400-5, 2003.
3. Nanotechnology; *Basic Science and Emerging Technologies*, CRC Press, 2002, ISBN 9781584883395
4. Charles P. Poole Jr and Frank J. Owens. "*Introduction to Nanotechnology*" Wiley, 2003, DOI: 10.1002/anie.200385124
5. R. B. Bhise, A. B. Bhise, V.D. Kulkarani, A.P Zambare, *Physics of Nanomaterials*, 2019 ISBN 978-93-89406-80-1
6. A. S. Edelstien and R.C. Cornmarata, *Nanomaterials; synthesis, Properties and Applications*, 2ed, Iop (U.K), 1996.
7. Shubra Singh M.S. Ramachandra Rao, Nanoscience and Nanotechnology: Fundamentals of Frontiers, Wiley publications, 2013.
8. Thomas Varghese & K.M. Balakrishna, *Nanotechnology: An Introduction to Synthesis, Properties and Applications of Nanomaterials,*Atlantic; Reprint 2016 edition (1 January 2021)
9. William Illsey Atkinson, *Nanotechnology,* Jaico Publishing House; First edition (9 July 2006)
10. Risal Singh ShipraMital Gupta, *Introduction to nanotechnology,* Oxford University Press (2018)
11. https://en.wikibooks.org/wiki/Nanotechnology
12. https://bookboon.com/en/nano-technology-ebook

COURSE OUTCOMES:

Upon completion of this course, the students would be able to:

- Classify the synthesizing techniques based on the states of matter
- Make use of the available instruments to study the properties of nanomaterials
- Assess the effect of grain sizes on various physical properties of nanomaterials
- Interpret the results of physical and chemical properties measurements
- Develop new materials for green energy and environmental applications

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Third Year **PROJECT** **Semester-VI**

Code: **Credit: 3**

The candidate shall be required to take up a Project Work by group or individual and submit it at the end of the final year. The Head of the Department shall assign the Guide who, in turn, will suggest the Project Work to the students in the beginning of the final year. A copy of the Project Report will be submitted to the University through the Head of the Department on or before the date fixed by the University.

The Project will be evaluated by an internal and an external examiner nominated by the University. The candidate concerned will have to defend his/her Project through a Viva-voce.

ASSESSMENT/EVALUATION/VIVA VOCE:

1. PROJECT REPORT EVALUATION (Both Internal & External)

   I. Plan of the Project - 20 marks

   II. Execution of the Plan/collection of Data / Organisation of Materials / Hypothesis, Testing etc and presentation of the report. - 45 marks

   III. Individual initiative - 15 marks

2. Viva-Voce / Internal & External - 20 marks

TOTAL **- 100 marks**

PASSING MINIMUM:

	Vivo-Voce 20 Marks	**Dissertation 80 Marks**
Project	40% out of 20 Marks (i.e. 8 Marks)	40% out of 80 marks (i.e. 32 marks)

A candidate who gets less than 40% in the Project must resubmit the Project Report. Such candidates need to defend the resubmitted Project at the Viva-voce within a month. A maximum of 2 chances will be given to the candidate.

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Third Year **SKILL BASED ELECTIVE II** **Semester VI**

DOMESTIC ELECTRICAL APPLIANCES AND MEASURING INSTRUMENTS

Code **(Theory)** **Credit: 2**

COURSE OBJECTIVES:

- To inculcate the knowledge of resistors, capacitors and electrical appliances
- To provide training on measuring instruments
- To provide knowledge of the working principles and constructions of house appliances

UNIT – I RESISTORS:

Resistance – unit – Law of resistance – effect of temperature on resistance (carbon, metal film, thin film, wire wound) – variable resistors – colour code.

UNIT – II INDUCTORS:

Inductance – General information – types of inductors (ferrite and choking inductors).

UNIT – III CAPACITORS:

Capacitors - Principle – types of capacitors (Air, Paper, electrolyte and mica) – fixed and variable capacitors – specifications - applications.

UNIT – IV LIGHT SOURCES:

Definition and units of light – luminous flux - Luminous intensity – illumination – units of luminous intensity – types of light sources – Sodium vapour lamp – Mercury vapour lamp – Fluorescent lamp.

UNIT – V MEASURING INSTRUMENTS:

Galvanometer – Ammeter – Voltmeter – Ohmmeter – Multimeter – CRO.

UNIT – VI ELECTRICAL APPLIANCES (For continuous internal assessment only):

Electric iron – Soldering iron – water heaters – Electric Oven – Geysers – Electric mixer - Bell and Buzzer – Electric fan – Emergency lamp – Refrigerator – Water cooler.

REFERENCES:

1. Home appliances GT Publications, Jaipur.

2. Electrical power – Dr. S. L. Uppal.
3. Basic Electrical Engineering – M. L. Anwani, Dhanapat Rai and Co. New Delhi.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to:

- Recall the concepts of resistors, inductors and capacitors
- Apply their skills on connecting various components like resistors, capacitors etc.
- Identify the defects in electrical appliances
- Rectify the defects in the parts of electrical appliances.
- Able to design prototypes of simple electrical appliances.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

B.Sc. Physics Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Sem	Part	Course	Title	Inst. Hours/ Week	Credit	Exam Hours	Marks		Total
							Int	Ext	
I	I	Language Course–I (LC) – Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course - I (ELC)		6	3	3	25	75	100
	III	Core Course–I (CC)	Properties of Matter and Acoustics	6	6	3	25	75	100
		Core Practical – I (CP)	Practical I	3	-	-	-	-	-
		First Allied Course–I (AC)		4	4	3	25	75	100
		First Allied Course–II (AC)		3	-	-	-	-	-
	IV	Value Education	Value Education	2	2	3	25	75	100
	Total			**30**	**18**				**500**
II	I	Language Course–II (LC)– Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course–II (ELC)		6	3	3	25	75	100
	III	Core Course–II (CC)	Mechanics	6	6	3	25	75	100
		Core Practical – I (CP)	Practical I	3	3	3	40	60	100
		First Allied Course–II (AC)		3	3	3	25	75	100
		First Allied Course–III (AC)		4	2	3	25	75	100
	IV	Environmental Studies	Environmental Studies	2	2	3	25	75	100
	Total			**30**	**22**				**700**
III	I	Language Course – III (LC)–Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course-III (ELC)		6	3	3	25	75	100
	III	Core Course – III (CC)	Thermal Physics	6	6	3	25	75	100
		Core Practical – II (CP)	Practical II	3	-	-	-	-	-
		Second Allied Course – I (AC)		4	4	3	25	75	100
		Second Allied Course-II (AP)		3	-	-	-	-	-
	IV	Non Major Elective I - for those who studied Tamil under Part-I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Energy Physics	2	2	3	25	75	100
	Total			**30**	**18**				**500**

IV	I	Language Course –IV (LC) - Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course – IV (ELC)		6	3	3	25	75	100
	III	Core Course – IV (CC)	Electricity, Magnetism and Electro Magnetism	5	5	3	25	75	100
		Core Practical – II (CP)	Practical II	3	3	3	40	60	100
		Second Allied Course - II (AP)		3	3	3	40	60	100
		Second Allied Course - III		3	2	3	25	75	100
	IV	Non Major Elective II-for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Laser Physics	2	2	3	25	75	100
		Skill Based Elective - I	Skill Based Elective - I	2	2	3	25	75	100
	Total			**30**	**23**				**800**
V	III	Core Course – V (CC)	Optics	5	5	3	25	75	100
		Core Course – VI (CC)	Atomic and Molecular Physics	5	5	3	25	75	100
		Core Course – VII (CC)	Electronics	6	5	3	25	75	100
		Core Practical – III (CP)	Practical III	3	3	3	40	60	100
		Major Based Elective – I	Material Science	5	5	3	25	75	100
	IV	Skill Based Elective – II	Skill Based Elective - II	2	2	3	25	75	100
		Skill Based Elective – III	Skill Based Elective - III	2	2	3	25	75	100
		Soft Skills Development	Soft Skills Development	2	2	3	25	75	100
	Total			**30**	**29**				**800**
VI	III	Core Course – VIII (CC)	Nuclear Physics	6	6	3	25	75	100
		Core Course – IX (CC)	Theoretical Physics	6	6	3	25	75	100
		Core Practical – IV (CP)	Practical IV	5	4	3	40	60	100
		Major Based Elective II	Microprocessor and 'C' Programming	6	6	3	25	75	100
		Major Based Elective III	Communication Physics	6	6	3	25	75	100
	V	Extension Activities	Extension Activities	-	1	-	-	-	-
		Gender Studies	Gender Studies	1	1	3	25	75	100
	Total			**30**	**30**				**600**
Grand Total				**180**	**140**				**3900**

List of Allied Courses

Allied Course I	**Allied Course II**
Mathematics	**Chemistry / Computer Science**

Language Part – I	-	4
English Part –II	-	4
Core Paper	-	9
Core Practical	-	4
Allied Paper	-	5
Allied Practical	-	1

Non-Major Elective	-	2	
Skill Based Elective	-	3	
Major Based Elective	-	3	
Environmental Studies	-	1	
Value Education	-	1	
Soft Skill Development	-	1	
Gender Studies	-	1	
Extension Activities	-	1	(Credit only)

* for those who studied Tamil upto 10th +2 (Regular Stream)

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

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

** Extension Activities shall be out side instruction hours

Non Major Elective I & II – for those who studied Tamil under Part I

a) Basic Tamil I & II for other language students
b) Special Tamil I & II for those who studied Tamil upto 10th or +2 but opt for other languages in degree programme

Note:

	Internal Marks	External Marks
1. Theory	25	75
2. Practical	40	60

3. Separate passing minimum is prescribed for Internal and External marks

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]
The passing minimum for University Examinations 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 University Examinations **shall be 40% out of 60 marks [**i.e. 24 marks]

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CORE COURSE I

PROPERTIES OF MATTER AND ACOUSTICS

Objective:

To identify the characteristics of matter in terms their properties and to know the basic principles of acoustics.

UNIT I Elasticity

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 done on increasing the area of a surface - Angle of contact - Neumann's triangle- Excess pressure inside a liquid drop and soap bubble - Excess pressure inside a curved liquid surface - Force between two plates separated by 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's law of viscous flow – streamlined and turbulent motion – Reynold's number - Poiseuille's formula 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 Stokes' formula - Viscosity of gases – Meyer's formula - Rankine's method - Variation of viscosity with temperature and pressure - Lubrication.

Equation of continuity of flow – Euler's equation for unidirectional flow - Bernoulli's theorem – Filter pump and Wings of aeroplane - Torricelli's theorem - Pitot tube.

UNIT V Acoustics

Newton's Formula for velocity of sound –Effect of Temperature, Pressure, Humidity , Density of medium and Wind - Musical Sound and Noise – Speech- Characteristics of Musical sound – Intensity of sound – Measurement of intensity ofsound :Decibel and Phon- Bel.

Reverberation – Sabine's Reverberation formula – Factors Affecting the Acoustics of Buildings – Sound distribution in an Auditorium – Requisites for good acoustics – Ultrasonics – Production and detection – Medical applications of Ultrasonic waves – Acoustic Grating.

Books for Study:

1. R. Murugeshan, *Properties of matte*r, S. Chand & Co. Pvt. Ltd., Revised edition, 2012.
2. D.S. Mathur*, Elements of Properties of matter*, S. Chand & Co. Pvt.Ltd., Revised edition, 2010
3. Brijlal & N. Subramanyam, *Properties of matter*, Vikas Publishng. Pvt. Ltd, 2005.
4. Brijlal & N. Subramanyam, *'A Text Book of Sound'*, Vikas Publishing. Pvt. Ltd, 2008.

Books for Reference:

1. Feynman, *Lectures on Physics*. Vol. I & II by Richard P. Feynman, The New Millennium Edition, 2012.
2. David Halliday and Robert Resnick, *Fundamentals of Physics* by Wiley Plus., 2013.
3. B.H. Flowers and E. Mendoza, *Properties of matter*, Wiley Plus, 1991.
4. H.R. Gulati*, Fundamentals of General properties of matter*, S. Chand & Co. Pvt. Ltd, 2012.
5. Chatterjee and Sen Gupta, *A treatise on general properties of matter*, New central Books agency (p) Ltd, Kolkata, 2001.
6. R.L. Saihgal, *A Text Book of Sound*, S. Chand & Co. Pvt. Ltd, New Delhi, 1979.

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CORE PRACTICAL I

(**Any Twelve Experiments)**

Objective:

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

1. Measurements of length (or diameter) using Vernier calipers, Screw gauge andTravelling microscope.
2. Non uniform bending - Pin & Microscope Method.
3. Cantilever depression—Scale and Telescope Method.
4. Surface Tension, Interfacial Surface Tension – Drop weight Method.
5. Surface Tension by Capillary rise method
6. Joule's Calorimeter - determination of Specific heat capacity of liquid.
7. Compound pendulum - g & k determination.
8. Specific heat capacity of liquid - Newton's law of cooling.
9. Coefficient of viscosity of liquid—Poiseuille's flow method.
10. Spectrometer - determination of μ of a solid prism.
11. P.O box – determination of Temperature coefficient.
12. Meter bridge - Specific resistance determination.
13. Comparison of Viscosities of two liquids – Ostwald's Viscometer/ HARE's appartus
14. Long focus convex lens - f, R, refractive index-determination.
15. Concave lens – Focal length determination.
16. Determination of the Elastic Constants of a Wire by Searle's method.
17. Determine the frequency of a given tuning fork – Sonometer.

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Books for Study :

1. Dr. S. Somasundaram, *Practical Physics*, Apsara publications, Tiruchirapalli, 2012.
2. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli 1998.

Books for Reference:

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.

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CORE COURSE II

MECHANICS

Objective:

An attempt is made to give a better insight of the change of position of any physical object or event and their consequences.

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 along a curved path - 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 – Escape velocity –Orbital velocity.

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 - Kater's 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, Floating bodies, Atmospheric pressure

Centre of gravity of a body - Centre of gravity of a trapezoidal lamina - C.G. of a solid hemisphere - C.G. of a solid tetrahedron - C.G. of a solid cone.

Centre of pressure - rectangular lamina - triangular lamina - triangular lamina immersed in a liquid.

Conditions of equilibrium of a floating body - Stability of equilibrium of a floating body - Metacentre - Experimental determination of a metacentric height of a ship.

The barometer - Fortin's barometer - Correction for a barometer - Faulty barometer - Variation of atmospheric pressure with altitude.

Books for study:

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.

Books for reference:

1. R. Murugesan, *Mechanics and Mathematical Physics*, S. Chand & Company Ltd., New Delhi, 2008.
2. D.S. Mathur, *Mechanics*, S. Chand & Company Ltd., New Delhi - 1990.

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CORE COURSE III

THERMAL PHYSICS

Objective :

To understand the phenomena connected with heat as radiation, conduction, different thermal capacities of substances and the converse process of making heat to do mechanical work.

UNIT I Specific Heat

Specific heat of solids – Method of mixtures – radation correction – Dulong and Petit's law - Quantum theory - Einstein's theory of specific heat – Debye's theory of specific heat– Specific heat of liquids – Newton's law of cooling - Specific heat of gases – Mayer's Relation – Quantization of various contributions to energy of diatomic molecules – Specific heat of diatomic gases.

UNIT II Conduction.

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

UNIT III Radiation

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

UNIT IV Low Temperature

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 – Air conditioning mechanism – solid carbon dioxide(dry ice).

UNIT V Thermodynamics

Zeroth law of thermodynamics – First law of thermodynamics – Heat engines – Reversible and irreversible process - Carnot's theorem – Second law of thermodynamics - Thermodynamic Scale of 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 – Clausius' - Claypeyron's latent heat equations.

Books for Study:

1. Brijlaland Subramaniyam, *Heat and Thermodynamics*, S. Chand &Co., 2001.
2. J. B. Rajamand C. L Arora*, Heat and Thermodynamics*, S. Chand & Co.1983.
3. Brijlaland Subramaniyam, *Heat and Thermodynamics & Statistical physics*, S. Chand & Co. 2015.

Books for Reference:

1. M. Narayanamoorthy and N. Nagarathinam, *Heat*, National publishing Co, Chennai, Eight edition, 1987.
2. D.S. Mathur, *Heat and Thermodynamics*, S. Chand & Co. 2014.

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CORE PRACTICAL II

(Any Twelve Experiments)

Objective:

To enhance the knowledge in experimental physics.

1. Uniform bending –Pin and Microscope.
2. Static Torsion -Determination of Rigidity modulus (n).
3. Torsional Pendulum – Rigidity modulus (n) and moment of inertia (I).
4. Stoke's method - Viscosity of highly viscous liquid.
5. Coefficient of viscosity of highly viscous liquid –Searle's viscometer method.
6. Emissive power of a surface - Spherical calorimeter.
7. Thermal conductivity of a bad conductor -Lee's disc method.
8. Carey Foster's Bridge –specific resistance determination.
9. Potentiometer - Ammeter calibration.
10. Potentiometer - Voltmeter calibration - low range.
11. Potentiometer - determination of resistance.
12. Figure of merit of a mirror Galvanometer.
13. Spectrometer -Determination μ of a liquid.
14. Spectrometer- Grating--normal incidence method.
15. Air Wedge - determination of Thickness of a thin wire.
16. High resistance by leakage – Using BG.
17. Characteristics of Junction and Zener diodes.

Books for Study :

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

2 Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli 1998.

Books for Reference:

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.

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NON-MAJOR ELECTIVE I

ENERGY PHYSICS

Objective:

To make the students to understand the present day crisis of need for conserving energy and alternatives are provided.

UNIT I Conventional Energy Sources

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

Renewable energy sources – Solar energy – nature and Solar radiation – components – Solar heaters – Crop dryers – Solar cookers – Water desalination (block diagram) -Photovoltaic generation – merits and demerits.

UNIT III Biomass energy fundamentals:

Biomass energy – classification – Photosynthesis – Biomass conversion process

UNIT IV Biomass Utilization

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

UNIT V Other forms of energy sources

Geothermal energy – Wind energy – Ocean thermal energy conversion – Energy from waves and tides (basic ideas).

Books for study:

1. D.P. Kothari, K.C. Singal & Rakesh Ranjan, *Renewable energy sources and emerging Technologies*, Prentice Hall of India Pvt. Ltd., New Delhi (2008).
2. Suhas P Sukhatme, *Solar energy -- Principles of thermal collection and storage,* Tata McGraw-Hill Publishing company, New Delhi, Second edition, 2012.

Books for References:

1. S.A. Abbasiand Nasema Abbasi, *Renewable Energy sources and their environmental impact,* PHI Learning Pvt. Ltd., New Delhi (2008).

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CORE COURSE IV

ELECTRICITY, MAGNETISM AND ELECTROMAGNETISM

Objective:

This course provides an in depth coverage of behaviour of stationary electric charges, electricity, magnetism and how they are connected.

UNIT I Electrostatics

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 a point due to a uniformly charged conducting sphere – Principle of a capacitor– Capacity of a spherical and cylindrical capacitors – Energy stored in a charged capacitor–Loss of energy on sharing of charges between two capacitors.

UNIT II Current Electricity

Ampere's circuital law and its applications -Field along the axis of a circular coil and Solenoid–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.

UNIT III Electromagnetic Induction

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 (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 and R– Measurement of High resistance by leakage.

UNIT IV AC Circuits

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 –Power in AC circuits (R, L-R, L-C-R only) – Power factor– Wattlesscurrent – Choke Coil – Transformer – Uses of Transformers – Skin Effect.

UNIT V Magnetism

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

Books for Study:

1. BrijLal and N. Subrahmanyam, *A Text Book of Electricity and Magnetism*, Ratan Prakasan Mandir Educational & University Publishers, New Deihi,2000.
2. R. Murugeshan, *Electricity and Magnetism*, S. Chand & Company Pvt. Ltd., New Delhi – 2015

Books for Reference:

1. D. L. Sehgal, K. L. Chopra and N. K. Sehgal, *Electricity and Magnetism*, S. Chand & Sons. New Delhi. 1996.

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NON MAJOR ELECTIVE II

LASER PHYSICS

Objective:

To introduce the physical and engineering principles of laser operation and their applications.

UNIT I Fundamentals of LASER

Spontaneous emission – Stimulated emission – Meta stable state – Population inversion – Pumping – Laser Characteristics

UNIT II Production of LASER

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

UNIT III Industrial Applications of LASER

Laser cutting – Welding – Drilling – Hologram – Recording and reconstruction of hologram

UNIT IV Lasers in Medicine

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

UNIT V Lasers in Communication

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

Books for study:

1. N. Avadhanulu , *An introduction to LASERS*, S. Chand & Company,2001.

Books for References:

1. William T. Silfvast, *Laser fundamentals*, University Press, Published in South Asia by Foundation books, New Delhi, 1998.
2. K. Thyagarajan and A.K. Ghatak, *LASER Theory and Application*, Mc Millan, India Ltd, 1984.

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CORE COURSE V

OPTICS

Objective :

To familiarize the fundamental laws concerning reflection, refraction, interference, diffraction, polarization, spectrum and allied phenomena.

UNIT I Geometrical optics

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

UNIT II Interference

Air wedge – Newton's rings – Haidinger's fringes – Brewster's fringes – Michelson Interferometer and its applications – Fabry- Perot Interferometer – Interference filter – Stationary waves in light – Colour photography (qualitatively) – Holography – Construction and reconstruction of a hologram – Applications.

UNIT III Diffraction

Fresnel's diffraction – Diffraction at a (1) circular aperture (2) Straight edge (3) narrow wire – Fraunhofer diffraction at a single slit – Double slit – Missing orders in a Double slit, Diffraction pattern – Grating (theory) – Oblique incidence – Overlapping of spectral lines - 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

Nicol prism – Nicol prism as an analyzer and polarizer – Huygens's explanation of Double refraction in uniaxial crystals – Double Image polarizing prisms – Elliptical and Circularly polarized light – Production and detection – Quarter wave and half wave plates – Babinets compensator – Optical activity – Fresnel's explanation of optical activity – Laurent's Half shade polarimeter.

UNIT V Optical Instruments

Microscopes – Simple Microscope (Magnifying glass) – Compound Microscope – Ultra-Microscope – Eyepieces - Huygen's Eyepiece - Ramsden's Eyepiese — Comparison of Eyepieces – Telescope – Refracting astronomical telescope – Abbe Refractometer – Pulfrich refractometer - Photographic Camera – Prism binoculars.

Books for study:

1. Dr. N. Subramaniyam, Brijlal and Dr.M.N. Avathanulu, *Optics*,S. Chand &Co. Pvt.Ltd.25 threvised edition , New Delhi ,2012 .
2. Dr. N. Subramaniyam, Brijlal and Dr.M.N. Avathanulu, *Optics*, S. Chand & Co. Pvt. Ltd.- 9th revised edition, New Delhi ,2014.
3. Krishnapada Ghosh Anandamoy Manna, *Text book of Physical Optics*, McMillan India Ltd, First edition, 2007.

Books for Reference:

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

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CORE COURSE VI

ATOMIC AND MOLECULAR PHYSICS

Objective:

The purpose is to understand the outgrowth of the structure ,extra nuclear part of the atom and origin of the spectra.

UNIT I Cathode and Positive Ray - Analysis

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, Dempster's and Bainbridge's mass - spectrographs (e/m) – Mass defect and Packing Fraction.

UNIT II Atom model

Bohr atom model – Critical Potentials - Experimental determination of critical potentials - Franck and Hertz's experiment -Sommerfield's Relativistic atom model - Vector atom model - Quantum numbers associated with vector atom model - Pauli's exclusion principle - Electronic configuration of elements and periodic table - Magnetic dipole moment due to orbital motion and spin of the electron - The Stern and Gerlach experiment - Zeeman effect - Experimental arrangement for the normal Zeeman effect - Larmor's theorem - Quantum mechanical explanation of the normal Zeeman effect - Anomalous Zeeman effect- Paschen Back Effect – Stark effect.

UNIT III X-Rays

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 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

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 - Experimental verification - Millikan's experiment - Photoelectric cells - Photoemissive cell - Photovoltaic cell - Photoconductive cell - Applications of Photoelectric cells.

UNIT V Molecular Physics

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 - Electronic spectra of molecules - Molecular orbital theory of Hydrogen molecule ion - Heitler-London theory of Hydrogen molecule - Theory of ESR .

Books for study:

1. R. Murugesan, KiruthigaSivaprasath, *Modern Physics*, S. Chand &Co Ltd., New Delhi, 14th Revised edition, 2014.
2. J.B. Rajam, *Atomic Physics*, S. Chand & Co Ltd., New Delhi, Revised edition, 2009.

Books for Reference:

1. Sehgal, Chopra and Sehgal, *Modern physics*, Sultan Chand & Sons,New Delhi.
2. Arthur Beiser, Shobhit Mahajan, S. RaiChoudhury, *Concepts of Modern Physics*, Sixth edition, SIE, 2009.
3. S.N .Ghoshal, *Atomic Physics*, S. Chand & Co Ltd., New Delhi, Revised edition, 2004.

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CORE COURSE VII

ELECTRONICS

Objective:

To enable the students to understand all aspects of electronics in a lucid and comprehensive manner.

UNIT I Semiconductors, diodes and Bipolar Transistors

Intrinsic and extrinsic semi -conductors –PN junction diode – Biasing–V-I Characteristics– Rectifiers – Half wave – full wave and Bridge rectifiers – Break down mechanisms – Zener diode- characteristics of Zener diode – Zener diode as voltage regulator-Bipolar junction transistor – Basic configurations -Relation between α and β – Characteristic curves of transistor – CB, CE mode – DC load line – DC bias and stabilization – fixed bias – voltage divider bias.

UNIT II Amplifiers and Oscillators

Single stage CE amplifier – Analysis of hybrid equivalent circuit – Power amplifiers – Efficiency of class A,B & C Power amplifier - General theory of feedback – Properties of negative feedback – Criterion for oscillations – Hartley oscillator – Colpitt's oscillator.

UNIT III Number Systems, Logic Gates and Boolean Algebra

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 (minterms) – Karnaugh map simplification(Four variables).

UNIT IV Combinational and Sequential Digital Systems

Half and full adders – Half and full subtractors – 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 - Shift registers – SISO and SIPO shift registers.

UNIT V Operational amplifier

Operational amplifier - Characteristics – Inverting and Non-inverting amplifier – Voltage follower – Adder, Subtractor, Integrator and Differentiator circuits – Log & antilog amplifiers – Op- amp as Comparator – Filters-low,

bandpass, high pass filters -A/D conversion – Successive approximation method – D/A conversion – R-2R ladder network.

Books for study:

1. Mehta V.K., *Principles of Electronics*, S. Chand and company Ltd, 2014.
2. A.P. Malvino, D.P. Leach, *Digital Principles and Application*, IV Edition, Tata McGraw Hill, New Delhi, 2011.
3. V. Vijayendran, *Digital Fundamentals*, S.Viswanathan, Printers & Publishers Private Ltd, Chennai, 2004.

Books for Reference :

1. Theraja. B.L, *Basic electronics - Solid State*, S.Chand and Company Ltd 2002.
2. Sedha R.S., *A text book of applied Electronics*, S.Chand & company Ltd 2002.
3. W.H.Gothmann, *Digital Electronics*, Prentice Hall of India, Pvt. Ltd., New Delhi 1996.

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CORE PRACTIAL III

(Any Twelve Experiments)

Objective:

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. Field along the axis of a coil – determination of M.
5. Potentiometer - EMF of a thermocouple.
6. Potentiometer -Temperature coefficient of thermistor.
7. Ballistic Galvanometer-Figure of merit
8. Ballistic Galvanometer-Absolute Determination of Mutual Inductance.
9. Anderson's bridge – Self-inductance of a coil.
10. Series resonance circuits.
11. Parallel Resonance circuits.
12. Regulated power supply using Zener diode - Percentage of regulation.
13. Single stage - RC coupled amplifier – Transistor.
14. Hartley oscillator using transistor.
15. FET Characteristics.
16. AND, OR and NOT gates using discrete components
17. AND, OR and NOT gates using IC's.
18. Op - Amp -Adder and Subtractor.
19. Op - Amp - Integrator and Differentiator.
20. Construction of Half wave rectifier.
21. Half Adder and Full adder circuits using logic gates.
22. Half Subtractor and Full Subtractor circuits using logic gates.

Books for Study :

1. Dr. S. Somasundaram, *Practical Physics*, Apsara publications, Tiruchirapalli, 2012.
2. Department of Physics, *Practical Physics*, (B.Sc. Physics Main), St. Joseph's College, Tiruchirapalli 1998.

Books for Reference:

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.

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MAJOR BASED ELECTIVE I

MATERIAL SCIENCE

Objectives:

To develop knowledge in material science and to understand the relationship between properties and material characteristics.

UNIT I Crystal Structure

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-cubic lattice-SC – BCC – FCC- Sodium chloride and Diamond crystal structure – Bonding of solids (Ionic , Covalent , Metallic , Hydrogen and Van der Waal).

UNIT II Super Conducting Materials

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 III Nano Materials

Nanoscience and nanotechnology – Nanomaterials- Properties of nanomaterials (size dependent) -synthesis of nanomaterials- Fullurenes-Application of nanomaterials – Carbon nanotubes- Fabrication and structure of carbon nano tubes - Properties of carbon nanotubes (Mechanical and Electrical) - Applications of CNT's.

UNIT IV Smart Materials

Metallic glass and its applications — Fiber reinforced metals – SAW Materials and its applications – Biomaterials – Ceramic-Nuclear engineering materials-Nanophase materials - SMART materials- Conducting polymers- Optical materials - Fiber optic materials and their applications.

UNIT V Mechanical Behavior Of Materials

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-Deformation of crystals and polycrystalline materials.

Books for study:

1. Dr. M.N. Avadhanulu, *Material science*, S.Chand & Company, New Delhi, 2014.

Books for Reference:

1. M.Arumugam, *Material science*, Anuradha puplishers, 1990.
2. V. Raghavan, *Material Science and Engineering* , Printice Hall India.,2004.
3. V. Rajendran, *Material Science*, Tata McGraw Hill Ltd, New Delhi,2001.

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CORE COURSE VIII

NUCLEAR PHYSICS

Objective:

To emphasize the understanding of nuclear forces and models, elementary particles and Accelerators.

UNIT I General Properties of Nuclei and Nuclear Models

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.

Nuclear Models - Liquid drop model, Semi-empirical mass formula - Shell model- Salient features of shell model.

UNIT II Radioactivity

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-Nuttall law - Tunnel effect - Gamow's theory of α decay - β-decay - Energetics of β-decay - Continuous β-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

Linear accelerator – Cyclotron – Betatron - Electron synchrotron - Accelerators in India.

Radiation Detectors - Ionisation Chamber - Proportional counter – G.M. Counter-Cloud chamber - Scintillation counter - Solid state track detector – Semiconductor detector.

UNIT IV Nuclear Reactions and Nuclear Reactors

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 - Prompt and delayed neutrons - Neutron speed , classifications - Nuclear chain reaction - Neutron cycle - Nuclear reactor - Types of reactor -Fission bomb - Nuclear power in India- Fusion-Thermonuclear reaction - Hydrogen bomb -Possibility of fusion reactor.

UNIT V Elementary Particles

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.

Books for Study:

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

Books for Reference:

1. S. N. Ghoshal,*Nuclear Physics* , S. Chand & Co., Edition ,2003.
2. M L Pandya& R. P .S .Yadav, *Elements of Nuclear Physics*,Kedaar Nath & Ram Nath ,2000.
3. SatyaPrakash, *Nuclear Physics*, A Pragati Prakasan Publication, 2011.
4. Jahan Singh, *Fundamentals of Nuclear Physics*, A Pragati Publication, 2012.
5. D.C.Tayal, *Nuclear Physics*, Himalaya Publishing House, 2009.

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CORE COURSE IX

THEORETICAL PHYSICS

Objective:

To know the facts and develop a unified and logical treatment of the subject matter with clarity and conciseness.

UNIT I Fundamental Principles and Lagrangian Formulation

Mechanics of a particle and system of particles – Conservation laws – Constraints – Generalized coordinates – Principle of virtual work-D' Alembert's principle and Lagrange's equation – Hamilton's principle –Lagrange's equation of motion – conservation theorems and symmetry properties –Atwood's machine – Simple pendulum.

UNIT II Hamilton's Formulation

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

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. Thomon's experiment for verifying De Broglie relation – Heisenberg's uncertainty Principle – Electron microscope – Gamma ray microscope.

UNIT IV Basics of Quantum Mechanics

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 Exactly Solvable Quantum Systems

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

Books for study:

1. S.L.Gupta., V. Kumar and H.V.Sharma, Pragathi Prakasan, *Classical Mechanics* Educational Publisher, Meerut, 25th edition, 2011.
2. Murughesan, R., *Modern Physics*, S.Chand & Co., New Delhi, 2006.

Books for Reference:

1. Arthur Beiser, *Concept of Modern Physics*: McGraw Hill Ed. V (1999).
2. H.Goldstein, *Classical Mechanics*, Narosa Book distributors, New Delhi 1980.
3. N.C.Rana and P.S.Joag, *Classical Mechanics*, Tata Mc Graw Hill, New Delhi 1991.
4. P M. Mathews and K. Venkatesan, *A Text Book of Quantum Mechanics* ,Tata McGrawHill, New Delhi, 1987.

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CORE PRACTIAL IV

(Any Twelve Experiments)

Objective:

To provide an indepth knowledge and skill in Electronics, C- Programming and Micro Processor.

SECTION – A

(Any Eight Experiments)

1. Koenig's method – Uniform bending.
2. Spectrometer - Grating-minimum deviation method
3. Spectrometer – Grating - dispersive power.
4. Spectrometer - Cauchy's constants.
5. M and H - Absolute determination using deflection and vibration magnetometer.
6. Potentiometer - High range Voltmeter calibration.
7. B.G. Absolute capacity of condenser.
8. Emitter follower amplifier - Frequency response.
9. Colpitt's oscillator using transistor.
10. Astable multi-vibrator using Transistor/op.amp
11. Monostable multi-vibrator using Transistor/op.amp.
12. FET amplifier – Common source.
13. Verification of Boolean Laws (any four.)
14. NAND as universal gate.
15. NOR as universal gate.

SECTION - B - MICROPROCESSOR 8085.(Any Two)

1. 8-bit addition and 8-bit subtraction.
2. 8-bit multiplication and 8-bit division.
3. Conversion from decimal to hexadecimal system.
4. Conversion from hexadecimal to decimal system.
5. Conversion from binary to hexadecimal.
6. Conversion from hexadecimal to binary.

SECTION- C - COMPUTER PROGRAMMING IN C (Any TWO)

1. Conversion of Centigrade into Fahrenheit.
2. Arranging numbers in ascending order/descending order.
3. Calculation of volume of sphere/cone/cube/rectangular cuboid.
4. Solving quadratic equation.
5. Sum of digits of a series.

Books for Study :

1. Dr.S.Somasundaram , *Practical Physics*, Apsara publications, Tiruchirapalli , 2012.
2. Department of Physics, *Practical Physics*, (B.Sc Physics Main), St. Joseph's College, Tiruchirapalli 1998.

Books for Reference:

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.

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MAJOR BASED ELECTIVE II

MICROPROCESSOR AND 'C' PROGRAMMING

Objective:

The purpose of this course is to introduce students about the key features and implementation of C language and 8085 Microprocessor assembly.

UNIT I Basics of Digital Computer

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

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

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-complement – shift – mask-look up table– multibyte addition and subtraction –decimal addition - subtraction.

UNIT IV Introduction To C

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– Arithmetic Expressions – Mathematical functions.

UNIT V Preliminaries And Functions

Data input and output – getchar, putchar, scanf, printf, gets, puts functions – Decision making and branching –if, if…else, else if ladder, switch, break, continue, goto – Decision making and looping – while, do… while, for, nested loops –Arrays (one-, two- and multi-dimensional arrays)- Declaration, Initialization of arrays.

Books for study:

1. B. Ram – *Fundamentals of Microprocessors and Microcontrollers*–Dhanpat Rai Publications (P) Ltd., New Delhi, 2013.
2. E. Balagurusamy – *Programming in ANSI C* – Tata McGraw Hill Education Private Limited, New Delhi,2012.

Books For Reference:

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

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MAJOR BASED ELECTIVE III

COMMUNICATION PHYSICS

Objective:

To promote scientific temper among students and update the basic functioning of various communication systems.

UNIT I Radio transmission and reception

Transmitter-modulation-need for modulation- types of modulation-amplitude,frequency and phase modulation- modulation factor-sideband frequencies in AM wave-limitations of amplitude modulation - frequency modulation-block diagram of AM and FM Transmitter.

Receiver- demodulation-AM & FM radio receivers-super heterodyne radio receiver.

UNIT II Fiber Optic Communication

Introduction –structure of optical fiber –total internal reflection in optical fiber – principal and propagation of light in optical fiber - acceptance angle - numerical aperture – types of optical fibers based on material – number of modes – refractive index profile - fiber optical communication system (block diagram) - fiber optic sensors – Temperature sensor – fiber optic endoscope.

UNIT III Radar Communication

Basic radar system -Radar range –Antenna scanning – Pulsed radar system - A-Scope- Plan position indicator- Tracking radar- Moving target indicator- Doppler effect-MTI Principle- CW Doppler Radar- Frequency modulator CW Radar.

UNIT IV Satellite Communication

Introduction – history of satellites – satellite communication system – satellite orbits – classification of satellites – types of satellites – basic components of satellite communication – constructional features of satellites- multiple access – communication package – antenna- power source – satellite foot points- satellite communication in India.

UNIT V Mobile Communication

GSM – mobile services- concept of cell – system architecture – radio interface – logical channels and frame hierarchy – protocols – localization and calling – Handover- facsimile (FAX) – application – VSAT (very small aperture terminals) – Modem – IPTV (internet protocol television) – Wi-Fi - 3G (Basic ideas only).

Books for Study:

1. Metha V.K., *Principles of Electronics*, S. Chand & Company Ltd., 2013
2. Anokh Singh and Chopra A.K., *Principles of communication Engineering*, S. Chand & Company PVT. Ltd., 2013.
3. Mani I. P., *A text book of Engineering Physics*, Dhanam Publications, Chennai-42, 2014.

Books for Reference:

1. Poornima Thangam I, *Satellite communication*, Charulatha Publications, 2012.
2. Dennis Roddy and John Coolen, *Electronic Communication*, PHI, 1990.
3. William C.Y. lee, *Cellular telecommunication* (second edition), Tata Mcgraw hill, 1991.

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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI- 620 024.

Applicable to the candidates admitted from the Academic year 2015-16 onwards

Part IV - VALUE EDUCATION (Revised syllabus)

Unit I Philosophy of Life and Social Values

Human Life on Earth (Kural 629) Purpose of Life (Kural 46) 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 Organisations

Definitions, Nature of Human Rights. Universal Declaration of Human Rights, International covenent on Civil and Political Rights - International covenent of Economic, Social and Cultural Rights. Amnesty International Red Cross.

Unit III Human Rights : Contemporary Challenges

Child labour - Womens Right - Bonded labour - Problems of refugees - Capital punishment. National and State Human Rights Commissions

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 613 004
2. திருக்குறள் - ஜி.யு.போப் - ஆங்கில மொழியாக்கத்துடன் உமா நூல். வெளியீட்டகம், தஞ்சாவூர்.
3. Leah Levin, Human Rights, NBT, 1998
4. V.R. Krishna Iyer, Dialetics and Dynamics of Human Rights in India, Tagore Law Lectures.
5. Yogic Thearpy - Swami Kuvalayananda and Dr.S.L.Vinekar, Government of India, Ministry of Health, New Delhi.
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BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI- 620 024

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: 3 **Ecosystems**

- 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:-

- 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
- Biogeographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Biological Diversity Act 2002/ BD Rules, 2004

(8 lectures)

Unit: 5 Environmental Pollution

Definition

Causes, effects and control measures of :

a. Air Pollution
b. Water Pollution
c. Soil Pollution
d. Marine Pollution
e. Noise pollution
f. Thermal Pollution
g. Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides.
- Ill-Effects of Fireworks: Firework and Celebrations, Health Hazards, Types of Fire, Firework and Safety

(8 lectures)

Unit: 6 Social Issues and the Environment

- From Unsustainable to Sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people; its problems and concerns.

Case studies

- Environmental ethics: Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and Control of Pollution) Act.
- Wildlife Protection Act.
- Forest Conservation Act.
- Issues involved in enforcement of environmental legislation
- Public awareness.

(7 lectures)

Unit: 7 Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Programmes
- Environment and human health
- Human Rights - Value Education
- HIV/ AIDS - Women and Child Welfare
- Role of Information Technology in Environment and human health
- Case studies.

Unit: 8 Field Work

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

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    (M) Magazine (R) Reference (TB) Textbook

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PROFESSIONAL ENGLISH FOR PHYSICAL SCIENCES-I

OBJECTIVES:

- To develop the language skills of students by offering adequate practice in professional contexts.
- To enhance the lexical, grammatical and socio-linguistic and communicative competence of first year physical sciences students
- To focus on developing students' knowledge of domain specific registers and the required language skills.
- To develop strategic competence that will help in efficient communication
- To sharpen students' critical thinking skills and make students culturally aware of the target situation.

LEARNING OUTCOMES:

- Recognise their own ability to improve their own competence in using the language
- Use language for speaking with confidence in an intelligible and acceptable manner
- Understand the importance of reading for life
- Read independently unfamiliar texts with comprehension
- Understand the importance of writing in academic life
- Write simple sentences without committing error of spelling or grammar

(Outcomes based on guidelines in UGC LOCF – Generic Elective)

UNIT 1: COMMUNICATION

1. **Listening**: Listening to instructions

2. **Speaking**: Telephone etiquette and Official phone conversations

3. **Reading** short passages (3 passages, one from each – Physics, Chemistry, Mathematics/Computer Science)

5. **Writing:** Letters and Emails in professional context

6. **Grammar in Context:**
    - Wh and yes or no,
    - Q tags
    - Imperatives

7, **Vocabulary in Context:** Word formation - .
    i) Creating antonyms using Prefixes
    ii) Intensifying prefixes (E. g inflammable)

Changing words using suffixes

A) Noun Endings
B) Adjective Endings
C) Verb Endings

UNIT 2: DESCRIPTION

Listening – Listening to process description

Speaking - Role play

Formal: With faculty and mentors in academic environment, workplace communication

Informal: With peers in academic environment, workplace communication

Reading –Reading passages on products, equipment and gadgets

Writing – Writing sentence definitions (e.g. computer) and extended definitions (e.g. artificial intelligence)

Picture Description – Description of Natural Phenomena

Grammar in Context: Connectives and linkers.

Vocabulary – Synonyms (register) - Compare & contrast expressions.

UNIT 3: NEGOTIATION STRATEGIES

Listening - Listening to interviews of specialists / inventors in fields (Subject specific)

Speaking – Brainstorming. (mind mapping). Small group discussions (subject-specific)

Reading – longer Reading text. (Comprehensive passages)

Writing – Essay Writing (250 word essay on topics related to subject area, like pollution, use of pesticides in cultivation, merits and demerits of devices like mobile phones, merits and demerits of technology in development)

Grammar in Context: Active voice & Passive voice – If conditional - Collocations –Phrasal verbs

UNIT 4: PRESENTATION SKILLS

Listening - Listening to presentation. Listening to lectures. Watching – documentaries (discovery / history channel)

Speaking –Short speech

- Making formal presentations (PPT)

Reading – Reading a written speech by eminent personalities in the relevant field /Short poems / Short biography.

Writing - Writing Recommendations

Interpreting visuals - charts / tables/flow diagrams/charts

Grammar in Context – Modals

Vocabulary (register) - Single word substitution

UNIT 5: CRITICAL THINKING SKILLS

Listening - Listening to advertisements/news and brief documentary films (with subtitles)

Speaking – Simple problems and suggesting solutions.

Reading: Motivational stories on Professional Competence, Professional Ethics and Life Skills (subject-specific)

Writing Studying problem and finding solutions- (Essay in 200 words)

Grammar-Make simple sentences

Vocabulary -Fixed expressions

SUGGESTED ACTIVITIES

UNIT 1

Listening: Links for formal conversation can be given - Gap filling exercises – Multiple Choice questions – Making notes.

Speaking - Role play activity

Reading – Note making. Note-Taking.

Writing: Guided Writing (developing hints)

Email

Grammar: Vocabulary – Worksheets – Games.

UNIT 2

Listening-

Process Descriptions (Processes of Condensation and Evaporation./Process of Measuring the thickness of a wire using a Screw -Gauge./process of Exaction of sugar from sugarcane)

Speaking – Role Play

Reading – Multiple choice questions - Evaluative answers – Classifying and labeling

Writing - Picture description – Description of natural phenomena (rainbow, earthquake, volcanic eruption, erosion, natural disasters in 150 to 200 words).

Vocabulary: Expansion of compound nouns

UNIT 3

Listening- Gap fill exercises – Listening comprehension

Speaking -Debates

Reading -Reading comprehension

Writing – Essay Writing

Grammar - Vocabulary, Activities, Worksheets & Games.

UNIT 4

Listening - Note taking (of listening & viewing items) - Filling a table based on the listening item.

Speaking – JAM, Presentations. (PPT-TECHNICAL)

Reading-Reading comprehension

Writing– Difference between recommendations and instructions

Questions/MCQs based on graphs/flow diagrams/charts

Grammar: Vocabulary – Activities, Worksheets & Games.

UNIT 5

Listening – Radio News/ TV-News telecast /

Speaking - Watch or listen to documentaries and ask questions

Reading - Reading motivational stories (success stories in subject area)

Writing - Essay writing.

Grammar -Vocabulary –Activities, Worksheets & Games

Professional English-Semester-II [part-III -add on Course]

Weightage: 4 Credits **Duration: 90hrs**

Objectives:

The Professional Communication Skills Course is intended to help Learners in Arts and Science colleges

- Develop their competence in the use of English with particular reference to the workplace situation.
- Enhance the creativity of the students, which will enable them to think of innovative ways to solve issues in the workplace.
- Develop their competence and competitiveness and thereby improve their employability skills.
- Help students with a research bent of mind develop their skills in writing reports and research proposals.

Unit 1- Communicative Competence (18 hrs)

Listening – Listening to two talks/lectures by specialists on selected subject specific topics -(TED Talks) and answering comprehension exercises (inferential questions)

Speaking: Small group discussions (the discussions could be based on the listening and reading passages- open ended questions

Reading: Two subject-based reading texts followed by comprehension activities/exercises

Writing: Summary writing based on the reading passages.

Grammar and vocabulary exercises/tasks to be designed based on the discourse patterns of the listening and reading texts in the book. This is applicable for all the units.

Unit 2 - Persuasive Communication (18 hrs)

Listening: listening to a product launch- sensitizing learners to the nuances of persuasive communication

Speaking: debates – Just-A Minute Activities

Reading: reading texts on advertisements (on products relevant to the subject areas) and answering inferential questions

Writing: dialogue writing- writing an argumentative /persuasive essay.

Unit 3- Digital Competence **(18 hrs)**

Listening to interviews (subject related)

Speaking: Interviews with subject specialists (usingvideo conferencing skills)

Creating Vlogs (How to become a vlogger and use vlogging tonurture interests – subject related)

Reading: Selected sample of Web Page (subject area)

Writing: Creating Web Pages

Reading Comprehension: Essay on Digital Competence for Academic and Professional Life.

The essay will address all aspects of digital competence in relation to MS Office and how they can be utilized in relation to work in the subject area

Unit 4 - Creativity and Imagination **(18 hrs)**

Listening to short (2 to 5 minutes) academic videos (prepared by EMRC/ other MOOC videos on Indian academic sites – E.g. https://www.youtube.com/watch?v=tpvicScuDyo)

Speaking: Making oral presentations through short films – subject based

Reading: Essay on Creativity and Imagination (subject based)

Writing – Basic Script Writing for short films (subject based)

- Creating blogs, flyers and brochures (subject based)
- Poster making – writing slogans/captions(subject based)

Unit 5- Workplace Communication& Basics of Academic Writing (18 hrs)

Speaking: Short academic presentation using PowerPoint

Reading & Writing: Product Profiles, Circulars, Minutes of Meeting.

Writing an introduction, paraphrasing

Punctuation(period, question mark, exclamation point, comma, semicolon, colon, dash, hyphen, parentheses, brackets, braces, apostrophe, quotation marks, and ellipsis)

Capitalization (use of upper case)

Outcomes of the Course.

At the end of the course, learners will be able to,

- Attend interviews with boldness and confidence.
- Adapt easily into the workplace context, having become communicatively competent.
- Apply to the Research &Development organisations/ sections in companies and offices with winning proposals.

Instruction to Course Writers:

1. **Acquisition of subject-related vocabulary should not be overlooked**. Textboxes with relevant vocabulary may be strategically placed as a Pre Task or in Summing Up
2. Grammar may be included if the text lends itself to the teaching of a Grammatical item. However, testing and evaluation does not include Grammar.

பாரதிதாசன் பல்கலைக்கழகம், திருச்சிராப்பள்ளி - 620 024

(2016-17ஆம் கல்வியாண்டு முதல் சேர்க்கை பெறும் மாணாக்கர்களுக்கு)

மூன்றாம் பருவம்

அடிப்படைத் தமிழ் - I
(Basic Tamil – I)

நோக்கம்: தமிழ்மொழியின் அடிப்படைகளை அறிந்துகொள்ளுதல். தமிழ் மொழியை எழுதவும் படிக்கவும் கற்றுக்கொள்ளுதல்.

அலகு 1

எழுத்துக்கள் அறிமுகம் - எழுத்துக்களின் வகைப்பாடு, எண்ணிக்கை - உயிரெழுத்துக்கள் - மெய்யெழுத்துக்கள் - உயிர்மெய்யெழுத்துக்கள் - ஆய்த எழுத்து - இனஎழுத்துக்கள் - வடமொழி எழுத்துக்கள்.

அலகு 2

எழுதும் பயிற்சி - தமிழ் எழுத்து வடிவங்களைக் காட்டி - அவற்றை இனங்காணவும் - வேறுபடுத்தி அறியவும் பயிற்சி தருதல் - ஒலிப்பு - பொருத்தமான எழுத்தைத் தேர்ந்தெடுக்கப் பரிசோதித்தல் - எழுத்துக்களை எழுதப் பயிற்றுவித்தல்.

அலகு 3

சொற்கள் கற்றல் - கோடிட்ட இடங்களை நிரப்புவதன் மூலம் எழுத்துகளையும் சொற்களையும் பயிற்றுவித்தல். வாசித்தல் - படம் ஒலிபெயர்ப்புச் சொல், இணையான ஆங்கிலச்சொல் முதலியவற்றைத் தந்து எழுத்துகளையும் சொற்களையும் பயிற்றுவித்தல்.

அலகு 4

சிறுதொடர் கற்றல் - எளிய தொடர்களை அறிமுகப்படுத்துதல் - சிறு தொடரின் உறுப்புகளைக் கற்றுத்தருதல் - அவ்வுறுப்புக்களைத் தொடரில் இனங்காணச்செய்தல் - சிறு தொடர்களை எழுதும் பயிற்சி தருதல்.

அலகு 5

மழலைப் பாடல்கள், அறநெறிக்கதைகள் - பாடல்களையும் கதைகளையும் பிழையின்றி வாசிக்கச் செய்தல் - பிழையின்றி எழுதச்செய்தல்.

பார்வை :

தமிழ் இணையப் பல்கலைக்கழகச் சான்றிதழ்க் கல்விப்பாடத்திட்டத்தில் உள்ள முதல் அலகான "அடிப்படைநிலை" (www.tamilvu.org)

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நான்காம்பருவம்

அடிப்படைத் தமிழ் - II
(Basic Tamil – II)

நோக்கம்: இப்பாடத்தில் கீழே தடித்த எழுத்துக்களில் தரப்பட்டுள்ள பாடங்களின் வழியாகத் தமிழ்மொழியை எழுதவும் வாசிக்கவும் பழக்குதல்.

அலகு 1

சந்தை - மலர்கள், காய்கறிகள், பழங்கள் முதலியன குறித்த செய்திகளை அறியச் செய்தல் - அவை தொடர்பான வாக்கியம் அமைக்கப் பழக்குதல் எங்கள் குடும்பம் - குடும்ப உறுப்பினர், குடும்ப உறவு முறைகள் பற்றி அறியச் செய்தல் - தொடர்பான சொற்கள், தொடர்கள் முதலியவற்றை வாசிக்கவும் எழுதவும் பழக்குதல்.

அலகு 2

விருந்தோம்பல் - உணவு பரிமாறும் முறை - உணவு வகைகள் முதலியன பற்றி விளக்கமாக அறியச் செய்தல் - ஆறு, குளம், கடல், வானம், மேகம், மலை, மழை முதலியன பற்றி அறியச் செய்தல் : இவை தொடர்பான சொற்கள், தொடர்கள் முதலியவற்றை வாசிக்கவும் எழுதவும் பழக்குதல்.

அலகு 3

பாரதியார் - பாரதியார் பற்றிய வரலாறு, அவரது ஓரிரு கவிதைகள் பற்றி அறியச்செய்தல் - கணைக்கால் இரும்பொறை - இம்மன்னனின் தன்மான உணர்வினை நாடகத்தின் வழியாக உணர்த்துதல். இப்பாடங்கள் தொடர்பான சொற்கள், தொடர்களை வாசிக்கவும் எழுதவும் பழக்குதல்.

அலகு 4

மாமல்லபுரம் - மாமல்லபுரம் அமைந்துள்ள இடம் மற்றும் கலைக்கோயில்கள் பற்றி விளக்குதல் - பயணம் - பேருந்தில் பயணம் செய்யும் முறையை விளங்க வைத்தல்இ வாசிக்கவும் எழுதவும் பழக்குதல்.

அலகு 5

மொழி - விளக்கம் - மொழிக்குடும்பங்கள் - உலகச் செம்மொழிகள் - இந்தியச் செம்மொழிகள் - செம்மொழித் தகுதிகள் - வரையறைகள் - வாழும் தமிழ்ச் செம்மொழி - தமிழின் தொன்மை - தமிழின் சிறப்புகள் - தமிழ்ச் செம்மொழி நூல்கள் - தமிழ்ச் செம்மொழி அறிந்தேற்பு பரிதிமாற்கலைஞர் அவர்கள் முதல் கலைஞர் திரு.மு.கருணாநிதி அவர்கள் வரை (அறிஞர்கள் - அமைப்புகள் - நிறுவனங்கள் - இயக்கங்கள் தொடர் முயற்சிகள் - அறப்போராட்டங்கள் - உலகத் தமிழ்ச் செம்மொழி மாநாடு, கோவை 2010)

பார்வை :

தமிழ் இணையப் பல்கலைக்கழகச் சான்றிதழ்க் கல்வி பாடத்திட்டத்தில் உள்ள இரண்டாம் அலகு மற்றும் மூன்றாம் அலகுகளான முறையே இடைநிலை, மேல்நிலை ஆகியவை (www.tamilvu.org).

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பாரதிதாசன் பல்கலைக்கழகம், திருச்சிராப்பள்ளி - 620 024
(2016-17ஆம் கல்வியாண்டு முதல் சேர்க்கை பெறும் மாணாக்கர்களுக்கு)

மூன்றாம் பருவம்

சிறப்புத் தமிழ் - தாள் I
(Special Tamil – I)

(பத்து அல்லது பன்னிரண்டாம் வகுப்பு வரை தமிழ் படித்திருந்து **இளநிலைப் பட்டப்படிப்பில் (UG) பகுதி I இல் இதர மொழிப்பாடங்கள் படிக்கின்ற மாணவ / மாணவியர்** படிக்க வேண்டிய **சிறப்புத் தமிழ் முதலாம் தாளுக்குரியபாடத்திட்டம்.** இப்பாடத்திட்டப் பகுதிகள் பல்கலைக்கழக இளங்கலை முதலாமாண்டு செய்யுள் திரட்டு நூலை அடிப்படையாகக் கொண்டது.)

அலகு - I

பாரதியார் 1. செந்தமிழ்நாடு 2. புதுமைப்பெண்
பாரதிதாசன் 1. அழகு 2. தமிழனுக்கு வீழ்ச்சியில்லை
கவிமணி தேசிகவிநாயகம் பிள்ளை 1. சுகாதாரக்கும்மி
சுரதா 1. கலப்பை

அலகு - II

கவி காமு ஷெரீப் 1. நிலவே சொல் 2. அறிய முயல்
கண்ணதாசன் 1. நட்பு
வாணிதாசன் 1. வாழ்க இளம்பரிதி

அலகு - III

நாட்டுப்புறப்பாடல்கள் 1. தாலாட்டுப் பாடல் 2. ஒப்பாரிப் பாடல்

புதுக்கவிதைகள்
1. அப்துல் ரகுமான் - வெற்றி
2. அறிவுமதி - நட்புக்காலம்
3. ஆண்டாள் பிரியதர்ஷினி - நிலாச்சோறு
4. சிற்பி - ஓடு ஓடு சங்கிலி
5. தாமரை - தீர்ப்பு
6. மீரா - தலைகுனிவு
7. மேத்தா.மு - வெளிச்சம் வெளியே இல்லை
8. வைரமுத்து – ருசி

ஐக்கூ கவிதைகள்
1. அமுதபாரதி 2. அரிமதி இளம்பரிதி 3. அரிமதி தென்னகன்
4. அன்பாதவன் 5. இராசன்.எ.மு. 6. உயிர்வேலி ஆலா
7. கார்முகில் 8. செந்தமிழன் 9. புதுவை இளவேனில்
10. புதுவை தமிழ் நெஞ்சன்

அலகு - IV

சிறுகதை 1. **கைவண்ணம்...(தேர்ந்தெடுக்கப்பட்டசிறுகதைகள்)**
தொகுப்பாசிரியர் முனைவர் தங்க. செந்தில்குமார்
அய்யா நிலையம்,கதவு எண், 1603,
ஆரோக்கிய நகர்,ஐந்தாம் தெரு,E.B. காலனி,
நாஞ்சிக்கோட்டைச் சாலை, தஞ்சாவூர் - 613 006
விலை ரூ.70/-

அலகு - V

இலக்கிய வரலாறு 1. மரபுக் கவிதை 2. புதுக்கவிதை 3. சிறுகதை

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நான்காம்பருவம்

சிறப்புத் தமிழ் - தாள் II
(Special Tamil – II)

(பத்து அல்லது பன்னிரண்டாம் வகுப்பு வரை தமிழ் படித்திருந்து பகுதி I இல் இதர மொழிப்பாடங்கள் படிக்கின்ற மாணவ / மாணவியர் படிக்க வேண்டிய **சிறப்புத் தமிழ் இரண்டாம் தாளுக்குரிய பாடத்திட்டம்.** இப்பாடத்திட்டப் பகுதிகள் பல்கலைக்கழக இளங்கலை இரண்டாமாண்டு செய்யுள் திரட்டு நூலை அடிப்படையாகக் கொண்டது.)

அலகு – I

புறநானூறு
1. 'வள்ளியோர் படர்ந்து' எனத் தொடங்கும் பாடல் (பாடல் எண். 47)
2. 'நின்னயந்துறைஞர்க்கும்' எனத் தொடங்கும் பாடல் (பாடல் எண். 163)

குறுந்தொகை
1. 'வில்லோன் காலன கழலே' எனத் தொடங்கும் பாடல் (பாடல் எண். 07)
2. 'அகவன் மகளே! அகவன் மகளே' எனத் தொடங்கும் பாடல் (பாடல் எண். 23)

அலகு – II

சிறுபாணாற்றுப்படை (முழுவதும்)

அலகு – III

திருக்குறள்
1. புறங்கூறாமை (அதிகாரம் 19) 2. மானம் (அதிகாரம் 97)

நாலடியார்
1. 'அரும்பெறல்' எனத் தொடங்கும் பாடல் (பாடல் எண். 34)
2. 'கல்லாதுபோகிய நாளும்' எனத் தொடங்கும் பாடல் (பாடல் எண். 169)

அலகு – IV

சிலப்பதிகாரம் - அடைக்கலக் காதை **(பல்கலைக்கழக செய்யுள் திரட்டில் உள்ள பகுதி மட்டும்)**

கம்பராமாயணம் - குகப் படலம் **(பல்கலைக்கழக செய்யுள் திரட்டில் உள்ள பகுதி மட்டும்)**

அலகு – V

இலக்கிய வரலாறு - அற இலக்கியம்,
சங்க இலக்கியம்
காப்பிய இலக்கியம்

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NON MAJOR ELECTIVES (ARTS)

(For the candidates admitted from the academic year 2016-2017)

SI. No.	DEPARTMENT OFFERING THE NON-MAJOR ELECTIVE COURSES	TITLE OF THE NON-MAJOR ELECTIVE COURSES
1.	Applied Tamil	I. தமிழ் நடைக்கூறுகள் II. சிந்தனையியல்
2.	B.Litt.	
3.	Pulavar Degree	
4.	Tamil	
5.	B.B.A. (Bachelor of Business Administration)	I. Management Principles **(or)** Stock Exchange Practices II. Banking Practices **(or)** International Business
6.	B.Com.	I. Personal Investment **(or)** Elements of Insurance II. Introduction to Accountancy **(or)** Salesmanship
7.	B.Com. (Applied)	
8.	B.Com. (Computer Applications)	
9.	B.Com. (Bank Management)	I. Banking Practices **(or)** Indian Banking System II. Rural Banking **(or)** Elements of Insurance
10.	B.Com (Corporate Secretaryship)	I. Elements of Company Law II. Stock Markets in India
11.	B.Com (Co-operation)	I. Fundamentals of Cooperation **(or)** Cooperative Finance and Banking II. Cooperatives in Foreign Countries **(or)** Cooperative Bookkeeping System
12.	Economics	I. Advertisement Management II. Economics of Transportation
13.	English	I. Presentation Skills II. Functional Skills
14.	History	I. Freedom Movement in India II. Working of Indian Constitution
15.	Journalism & Mass Communication	I. Basic Photography II. Freelance Journalism
16.	Public Administration	I. Public Administration for Civil Services II. Indian Government and Administration
17.	Sanskrit	I. Introduction to Early Sanskrit Literature **(or)** History of fables & Popular tales and Didactic Literature Pub. R.S. Vadhyer Pub. Palakad II. Scientific Literature **(or)** Indian Aesthetics
18.	Social Work	I. Human Rights II. Contemporary Social Issues and Problems
19.	Sociology	I. Dynamics of Society II. Women Empowerment
20.	Tourism And Travel Management	I. Basics of Tourism II. Cultural Tourism

NON MAJOR ELECTIVES (SCIENCE)

(For the candidates admitted from the academic year 2016-2017 onwards)

SI. No.	DEPARTMENT OFFERING THE NON-MAJOR ELECTIVE COURSES	TITLE OF THE NON-MAJOR ELECTIVE COURSES
1.	Apparel and Fashion Technology	I. Hand Embroidery (P) II. Jewellery Making (P)
2.	BCA	I. Working Principles of Internet II. Fundamentals of Information Technology
3.	Biochemistry	I. Health and diseases II. Hospital Management
4.	Biotechnology	I. Biotechnology for Human Welfare II. Food Processing
5.	Botany	I. Biofertilizers & Biopesticides II. Horticulture
6.	Chemistry	I. Chemistry in Everyday Life II. Health Chemistry
7.	Computer Science	I. Working Principles of Internet II. Fundamentals of Information Technology
8.	Electronics	I. Principles of Electronics II. Everyday Electronics
9.	Fashion Technology & Costume Designing	I. Fashion Accessories Designing II. Visual Merchandising
10.	Geography	I. Geography of Tourism II. Disaster Management
11.	Geology	I. Fundamentals of Geology II. Introduction to Minerals, Rocks and Fossils
12.	Home Science	I. Bakery and Food Preservation II. Apparel Designing
13.	Hospital Administration	I. Personal Hygiene II. Role of Hospital Services
14.	Hotel Management & Catering Science	I. Basic Tamil / Special Tamil II. Basic Tamil / Special Tamil
15.	Information Technology	I. Fundamentals of Information Technology II. Information Security : Principles and Practices
16.	Mathematics	I. Quantitative Aptitude I II. Quantitative Aptitude II
17.	Microbiology	I. Mushroom Technology II. Biofertilizer Technology
18.	Nutrition & Dietetics	I. Nutrition for Women II. Nutrition for Health and Fitness

19.	Physics	I. Energy Physics II. Laser Physics
20.	Software Development	I. Working Principles of Internet II. Fundamentals of Information Technology
21.	Textile Science	I. Management and Entrepreneurship II. Marketing and Merchandising
22.	Visual Communication	I. Basics of Communication II. Communication Personality Development
23.	Zoology	I. Public Health and Hygiene II. Ornamental fish farming

NON-MAJOR ELECTIVE - I

PUBLIC ADMINISTRATION FOR CIVIL SERVICES

Objectives :

1. Students studying other majors may get familiarize with the basic concepts of Public Administration
2. To expose the students to various basic theories in Public administration.

Unit I - Introduction Meaning, Nature, Scope and Significance of Public Administration - Comparative Public Administration - Public and Private Administration - New Public Management.

Unit II - Basic Concepts Organisation - Hierarchy - Unity of command - Span of control - Co-ordination - Centralization and Decentralization - Line and Staff.

Unit III - Theories of Administration Scientific Management (Taylor and the Scientific Management Movement) - Classical Theory (Fayol, Urwick, Gulick and others) - Bureaucratic Theory (Weber and his critics) - Behavoural Approach - Systems approach.

Unit IV - Administrative Behaviour Decision making - Communication and control, Leadership.

Unit V - Accountability and Control The concepts of Accountability and control : Legislative, Executive and Judicial control - Citizen and Administration : Role of civil society - People's Participation and Right to Information.

Reference :

1. Avasthi and S.R. Maheswari , " Public Administration', Lakshmi Navas, Agra, 2006
2. Rumki Basu, Concepts and Theories of Administration, Sterling Publication,New delhi2004.
3. Lakshmi Kanth P, Public Administration for UPSC McGraw Hill, New Delhi-2011.

NON-MAJOR ELECTIVE - II

INDIAN GOVERNMENT AND ADMINISTRATION

Objective : It facilitates the students to understand its various aspects of the subjects - evolution and constitutional frame work, salient features of Indian Administration, Union executive, State executive, District Administration.

Unit - I Evolution of Indian Administration - Constitutional Development Framework – Salient Feature of Indian constitution

Unit - II Union Administration – President - Prime Minister - Council of Ministers – Ministries and Departments – Supreme Court.

Unit - III State Administration – Executive – Council of Ministers – Departments and Directorate – State Public Service Commission – High Court – District Administration – Local Government.

Unit - IV Constitutional Authorities - Finance Commission - Union Public Service Commission - Election Commission - Comptroller and Auditor General of India

Unit - V Issues in Indian Administration - Generalists vs. Specialists - Centre-State relations Corruption – Lokpal, Lokayuktha - Administrative Reforms in India

References:

1. Dr.Vishnoo Bhagwan and Dr.Vidya Bhushan Indian Administration, S.Chand and Company Ltd., New Delhi, 2011.

2. M.Sharma ,Indian Administration ,Anmol Publications Pvt. Ltd., New Delhi, 2007.

3. S.R. Maheswari ,Indian Administration, S.Chand Co., New Delhi, 2010.

SKILL BASED ELECTIVE PAPERS

(2016 onwards)

Updated on 19.02.2018

Sl. No.	Skill Based Elective Paper	Paper	Semester	Title of the Paper
1.	Clinical Microbiology	I	IV	Clinical Bacteriology
		II	V	Clinical Mycology and Virology
		III	V	Clinical Parasitology
2.	Computer Application	I	IV	Hardware Troubleshooting
		II	V	Ruby on Rails
		III	V	Web Services
3.	Customer Relationship Management	I	IV	Overview of Customer Relationship Management (CRM)
		II	V	CRM in Services Marketing & its Tools
		III	V	E – CRM (Virtual Marketing)
4.	Desktop Publishing	I	IV	Page Maker
		II	V	Corel Draw
		III	V	Dream weaver
5.	Herbal Medicine	I	IV	Ethno Medicine
		II	V	Pharmacognosy
		III	V	Herbs and Drug Action
6.	Journalism and Public Relations	I	IV	Journalism and Mass Media
		II	V	Reporting and Editing
		III	V	Public Relations
7.	Office Management	I	IV	Introduction to Office Management
		II	V	Office Management Tools
		III	V	Communication & Interpersonal Skills
8.	Sales and Marketing Management	I	IV	Introduction to Marketing Management
		II	V	Sales Management
		III	V	Retail Management
9.	Tourism and Travel Management	I	IV	Tourism and Travel Agency
		II	V	Cultural Tourism in India
		III	V	Tourism Product – 3
10.	Yoga and Stress Management	I	IV	Fundamentals of Yogic Practices
		II	V	Stress Management Through Yoga
		III	V	Asanas and Pranayamas – Practical
11.	அச்சு ஊடகங்கள்	I	IV	தமிழ் இதழியல் வரலாறு
		II	V	நாளிதழ் உருவாக்கமும் வடிவமைப்பும்
		III	V	இலக்கிய இதழ்கள்
12.	**Biotechnology**	I	IV	Aqua Culture
		II	V	Biofertilizer
		III	V	Mushroom Cultivation and Value Addition
13.	**Chemistry**	I	IV	Food and Nutrition
		II	V	Agricultural Chemistry
		III	V	Dyeing Techniques and Water Treatment

14.	**Electronics**	I	IV	Home Appliance Maintenance and Servicing
		II	V	Computer Hardware and Networking
		III	V	Mobile Servicing
15.	**Hotel Management and Catering Science**	I	IV	Hospitality Marketing
		II	V	Information Technology in Hotel Industry
		III	V	Information Technology in Hotel Industry (P)
16.	**Microbiology**	I	IV	Microbial Nanotechnology
		II	V	Diagnostic Microbiology
		III	V	Antimicrobial agents
17.	**Zoology**	I	IV	Apiculture
				Aquaculture
		II	V	Sericulture
				Poultry Farming
		III	V	Vermiculture
				Dairy farming

SKILL BASED ELECTIVE PAPERS
(2016 onwards)

Sl. No.	Skill Based Elective Paper	Paper	Semester	Title of the Paper
1.	அச்சு ஊடகங்கள்	I	IV	தமிழ் இதழியல் வரலாறு
		II	V	நாளிதழ் உருவாக்கமும் வடிவமைப்பும்
		III	V	இலக்கிய இதழ்கள்
2.	**Biotechnology**	I	IV	Aqua Culture
		II	V	Biofertilizer
		III	V	Mushroom Cultivation and Value Addition
3.	**Chemistry**	I	IV	Food and Nutrition
		II	V	Agricultural Chemistry
		III	V	Dyeing Techniques and Water Treatment
4.	Clinical Microbiology	I	IV	Clinical Bacteriology
		II	V	Clinical Mycology and Virology
		III	V	Clinical Parasitology
5.	Computer Application	I	IV	Hardware Troubleshooting
		II	V	Ruby on Rails
		III	V	Web Services
6.	Customer Relationship Management	I	IV	Overview of Customer Relationship Management (CRM)
		II	V	CRM in Services Marketing & its Tools
		III	V	E – CRM (Virtual Marketing)
7.	Desktop Publishing	I	IV	Page Maker
		II	V	Corel Draw
		III	V	Dream weaver
8.	**Electronics**	I	IV	Home Appliance Maintenance and Servicing
		II	V	Computer Hardware and Networking
		III	V	Mobile Servicing
9.	Herbal Medicine	I	IV	Ethno Medicine
		II	V	Pharmacognosy
		III	V	Herbs and Drug Action
10.	**Hotel Management and Catering Science**	I	IV	Hospitality Marketing
		II	V	Information Technology in Hotel Industry
		III	V	Information Technology in Hotel Industry (P)
11.	Journalism and Public Relations	I	IV	Journalism and Mass Media
		II	V	Reporting and Editing
		III	V	Public Relations
12.	**Microbiology**	I	IV	Microbial Nanotechnology
		II	V	Diagnostic Microbiology
		III	V	Antimicrobial agents

13.	Office Management	I	IV	Introduction to Office Management
		II	V	Office Management Tools
		III	V	Communication & Interpersonal Skills
14.	Sales and Marketing Management	I	IV	Introduction to Marketing Management
		II	V	Sales Management
		III	V	Retail Management
15.	Travel and Tourism Management	I	IV	Tourism and Travel Agency
		II	V	Cultural Tourism in India
		III	V	Tourism Product – 3
16.	Yoga and Stress Management	I	IV	Fundamentals of Yogic Practices
		II	V	Stress Management Through Yoga
		III	V	Asanas and Pranayamas – Practical
17.	**Zoology**	I	IV	Apiculture
				Aquaculture
		II	V	Sericulture
				Poultry Farming
		III	V	Vermiculture
				Dairy farming

YOGA AND STRESS MANAGEMENT

Skill Based Elective I (Semester-IV)

FUNDAMENTALS OF YOGIC PRACTICES

Unit I

Meaning and definition of Yoga – aims & objectives of yoga – misconception about yoga. Historical perceptive on yoga – yoga before the time of Patanjali (Indus valley civilization, Vedas, Brahmnas, Upanishads, Epics, Puranas). Contributions of Patanjali and Thirumular to yoga. Yoga practices and other systems of exercises.

Unit II

Schools of Yoga: Bhakthi Yoga, Jnana Yoga, Karma Yoga, Kundalini Yoga, Mantra Yoga, Hatha Yoga, Raja Yoga. Eight Limbs of Yoga: Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana & Samathi. General principles of practicing Asana, Pranayama, Meditation, Kriyas Bandhas and Mudra.

Unit III

Classification of Asanas - Meditative Asanas – Relaxative Asanas – Cultural Asanas. - safety measure and precautions while performing asanas. Pranayama – different phases in Pranayama practices: Puraka (Inhalation), Kumbhaka (Retention) and Recaka (Exhalation), - safety measures and precautions while performing pranayama. Meditation - Its techniques & benefits. Practicing methods and benefits of Kriyas, Bandha and Mudra.

Unit IV

Impact of Yoga on Muscular system, Respiratory System, Circulatory system, Nervous system, Digestive system and Endocrine system

Unit V

Yoga and development of Social qualities of personality – Co-operation – Simplicity – Tolerance – Social adjustments – Yoga and personal efficiency. Improvement of personal efficiency through yoga.

Reference

Author's guide, (2003). Yoga – The Science of Holistic living. Chennai: Vivekananda Kendra Prakashana trust

Chandrasekaran, K., (1999) Sound Health through Yoga. Sedapatti: Prem Kalyan Publications.

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Mariayyah, P., (2000). Suriyanamaskar. Perunthurai: Jaya Publishing House.

Tummers, Nanette. E., (2009) Teaching Yoga for Life. Champaign: Human Kinetics.

Skill Based Elective II (Semester V)

STRESS MANAGEMENT THROUGH YOGA

Unit I

Meaning and Definition of Stress. Types: Eutress, Distress, Anticipatory Anxiety, Intense Anxiety and Depression. Meaning of Management – Stress Management.

Unit II

Concept of Stress according to Yoga: Patanjali aphorism (PYS II - 3) Avidya Asmita. Bhagavad – Gita (Gita II 62-63) Dhayato Visayam Punsah … Yoga Vasistha and Upanishad.

Unit III

Physiology of Stress on: Autonomic Nervous System (ANS), Endocrine System, Hypothalamus, Cerebral Cortex and Neurohumours.

Unit IV

Mechanism of Stress related diseases: Psychic, Psychosomatic, Somatic and Organic phase. Role of Meditation & Pranayama on stress – physiological aspect of Meditation. Constant stress & strain, anxiety, conflicts resulting in fatigue among Executive. Contribution of Yoga to solve the stress related problems of Executive.

Unit V

Meaning and definition of Health – various dimensions of health (Physical, Mental, Social and Spiritual) – Yoga and health – Yoga as therapy. Physical fitness. Stress control exercise – Sitting meditation, Walking meditation, Progressive muscular relaxation, Gentle stretches and Massage.

Reference

Andrews, Linda Wasmer., (2005). Stress Control for peace of Mind. London: Greenwich Editions

Lalvani, Vimla., (1998). Yoga for stress. London: Hamlyn

Nagendra, H.R., and Nagarathana, R., (2004). Yoga perspective in stress management. Bangalore: Swami Vivekananda Yoga Prakashana.

Nagendra, H.R., and Nagarathana, R., (2004). Yoga practices for anxiety & depression. Bangalore: Swami Sukhabodhanandha Yoga Prakashana.

Sukhabodhanandha, Swami., (2002). Stress Management. Banglore: Prasanna trust.

Udupa, K.N., (1996). Stress management by Yoga. NewDelhi: Motilal Banaridass Publishers Private Limited.

Skill Based Elective III (Semester V)

ASANAS AND PRANAYAMAS – PRACTICAL

UNIT I

Meditative Asanas: 1. Sukhasana, 2. Siddhaasana (or) Siddhayoniasana, 3.Ardha Padmasana (or) Padmasana 4.Vajrasana **Relaxative Asanas** 5. Makarasana 6. Advasana 7. Matsya Kridasana 8. Shavasana,9. Jyestikasana

UNIT II

Cultural Asanas: 10.Tadasana, 11.Ardha Katti Chakarasana, 12. Pada Hastasana, 13. Utkattasana 14. Parivruthu Trikonasana, 15. Garudasana, 16. Bakasana, 17. Sithilai Tadasana 18. Ardha Chakrasana 19. Vrksasana 20. Trikonasana, 21. Natarajasana, 22. Virabhadrasana

Sitting Postures: 23. Machiyasana, 24. Sasangasana 25. Parvatasana, 26. Dandasana, 27. Janu Sirshasana 28. Ardha Padma Pachimottasana, 29. Ustrasana, 30. Baddha Padmasana,31.Tolasana 32. Tolangulasana, 33. Supta Vajrasana, 34. Vakrasana, 35. Ardha Sirsasana, 36. Baddha Konasana 37.Sithilai Dandasana, 38. Pachimottasana, 39. Ardha Ustrasana, 40. Yoga Mudra, 41. Saithalyasana 42. Gomukasana, 43. Veerasana, 44. Baddha Padmasana.

UNIT III

Prone Postures: 45. Bhujangasana, 46. Salabhasana, 47. Naukasana, 48 Ardha Salabasana, 49. Dhanurasana, 50.Sarpasana.

Supine Postures:

51. Navasana
52. Viparitha Karani
53. Uttana Padasana
54. Chakrasana
55. Tolangulasana
56. Matsyasana
57. Ardha Padma Halasana
58. Sethu Bandhasana
59. Pawanamuktasana
60. Padma sarvangasana
61. Halasana
62. Marjariasana
63. Sarvangasana
64. Ardha Hanlasana
65. Uttana Padasna

UNIT IV

Pranayamas

1.Suha Pranayama
2.Chandra Bhedana Pranayama
3.Sitkari Pranayama
4.Surya Bhedana Pranayama
5.Sitali Pranayama
6.Chandra Anuloma Viloma
7.Nadi Shodhana
8.Surya Anuloma Viloma Pranayama
9.Bharamari Pranayama

UNIT V

Preparation for Meditation, (sitting in meditative Asanas with Concentration on Tip of the Nose and Centre of eye brow) pranadarana (Body awareness) - Yoga Nidra.

Reference

Iyengar, BKS., (2003). The Art of Yoga. New Delhi: Harper Collins Publishers.

Maguire, Imelda., (2005). Yoga for a Healthy Body. London: Greenwich Editions.

Ravishankar.N.S., (2001). Yoga for Health. New Delhi: Pustak Mahal.

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Yogendra, Hansa Jayadeva and Desai, Armaiti Neriosand., (1991) Yoga for back and joint disorders. Mumbai: Dr.Jayadeva Yogendra for the yoga institute.

BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI - 24.
UNDER GRADUATE DEGREE PROGRAMMES

SOFT SKILLS DEVELOPMENT

Learning Objective

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-Practising 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:

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. Complex, Chatiram Bus Stand, Tiruchirappalli- 620 002.
(Phone No: 0431-2702824: Mobile No: 94433 70597, 98430 74472)

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:

(i) Developing the leader within you John c Maxwell
(ii) Good to Great by *Jim Collins*
(iii) The seven habits of highly effective people Stephen Covey
(iv) Emotional Intelligence Daniel Goleman
(v) You can win Shive Khera
(vi) Principle centred leadership Stephen Covey

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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 – Religion Work Vs Employment – Market – Media – Politics – Law – Domestic Violence – 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

பாலின சமத்துவம்

அலகு - I

பாலினம் தொடர்பான கோட்பாடுகள் :பாலியல் - பாலினம் - உடற்கூறுரீதியாக நிர்ணயித்தல் - ஆணாதிக்கம் - பெண்ணியம் - பாலின பாகுபாடு – பாலின வேலைப்பாகுபாடு – பாலின ஒருபடித்தானவைகள் - பாலின உணர்வூட்டல் - பாலின சமவாய்ப்பு – பாலின சமத்துவம் - பாலின மையநீரோட்டமாக்கல் - அதிகாரப்படுத்துதல்

அலகு -II

மகளிரியல் Vs பாலின சமத்துவக்கல்வி – பல்கலைக்கழக மானியக்குழுவின் வழிக்காட்டுதல்கள் - ஏழாவது ஐந்தாண்டுதிட்டம் முதல் பதினோராவது ஐந்தாண்டுதிட்டம் - பாலின சமத்துவக்கல்வி : பெய்ஜிங் மாநாடு மற்றும் பெண்களுக்கு எதிரான அனைத்து வன்முறைகளையும் ஒழிப்பதற்கான சர்வதேச உடன்படிக்கை - இணைத்தல் /உட்படுத்துதல் - ஒதுக்கல் -

அலகு – III

பாலியல் பாகுபாட்டிற்கான தளங்கள் : குடும்பம் - பாலின விகிதாச்சாரம் - கல்வி – ஆரோக்கியம் - ஆளுமை –மதம் - வேலை Vs வேலை வாய்ப்பு – சந்தை – ஊடகங்கள் - அரசியல் - சட்டம் -குடும்ப வன்முறை –பாலியல் துன்புறுத்தல் - அரசு கொள்கைகள் மற்றும் திட்டங்கள் .

அலகு – IV

பெண்கள் மேம்பாடு மற்றும் பாலின சமத்துவ மேம்பாடு : முயற்சிகள் - சர்வதேச பெண்களுக்கான தசாப்தம் - சர்வதேச பெண்கள் ஆண்டு – பெண்களின் மேம்பாட்டிற்கான தேசிய கொள்கை – பெண்கள் அதிகார ஆண்டு 2001 – சர்வதேச கொள்கைகளை மைய நீரோட்டமாக்கல்

அலகு – V

பெண்கள் இயக்கங்கள் மற்றும் பாதுகாப்பு நிறுவன ஏற்பாடுகள் : தேசிய மற்றும் மாநில மகளிர் ஆணையம் - அனைத்து மகளிர் காவல் நிலையங்கள் - குடும்ப நீதி மன்றங்கள் - குடும்ப வன்முறையிலிருந்து பெண்களைப் பாதுகாக்கும் சட்டம் 2005 – பணியிடங்களில் பெண்கள் மீதான பாலியல் துன்புறுத்தல்களை தடுப்பதற்கான உச்சநீதிமன்ற வழிகாட்டுதல்கள் - தாய்சேய் சேமநலச்சட்டம் - பெண்சிசுவை கருவிலேயே கண்டறியும் தொழில் நுட்பம் (முறைப்படுத்துதல் மற்றும் தவறாக பயன்படுத்துதலை தடை செய்திடும்) சட்டம் - ஈவ்டீசிங் (பெண்களை தொல்லை செய்தல்) தடுப்புச்சட்டம் - சுய உதவிக் குழுக்கள் - பஞ்சாயத்து அமைப்புகளுக்கான 73வது மற்றும் 74வது சட்டத்திருத்தம்.

References

1. Bhasin Kamala, Understanding Gender : Gender Basics , New Delhi : Women Unlimited , 2004
2. Bhasin Kamala, Exploring Masculinity: Gender Basics , New Delhi: Women Unlimited ,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 :Sage Publications,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
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12. Wharton .S Amy , The Sociology of Gender : An Introduction to Theory and Research , USA : Blackwell Publishing ,2005
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14. Arya Sadhna Women ,Gender Equality and the State ,New Delhi :Deep &Deep Publication, 2000
15. பாலியலை புரிந்து கொள்வோம், மதுரை :ஏக்தா,……..
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17. Chari Leelavathi ,Know Your Rights ,Madras; Tamilnadu Social Welfare Board,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
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21. கு.சாமிதுரை& இராதாகிருட்டிணன், பெண்கள் நலன் காக்கும் சட்டங்கள், மதுரை: Account Test Center:2007
22. பொன்.கிருஷ்ணசாமி,ஜே.பால் பாஸ்கர்&ஆ.ஜான் வின்சென்ட், பெண்களும் உச்ச நீதிமன்றமும், மதுரை :சோக்கோ வாசகர் வட்டம், 2004
23. வனஜா &சியாமா சுந்தரி, பெண்களுக்கான சட்டங்கள், செகந்திராபாத் : உலகத்தோழமை மையம்
24. க.உமாசங்கர், பி.பாலசந்தர், க.சசிகலா, செ.பழனிச்சாமி, சூரியன் (பெண்கள் தொடர்பான சட்டங்கள் குறித்த தொடக்கநிலை கையேடு: செகந்திராபாத்: உலகத்தோழமை மையம்,2006
25. குடும்ப வன்முறையிலிருந்து பெண்களை பாதுகாக்கும் சட்டம் 2005- கையேடு, திருச்சி:
26. Women's Integrated National Development Trust
27. ரவீந்திரநாத். ஜி.ஆர்., 'ராகிங் ஒழிப்போம்!' 'ஈவ்டிசிங்' ஒழிப்போம், சென்னை I.D.P.D.வெளியீடு

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CODE OF CONDUCT FOR STUDENTS

1. Students should not leave the College premises during class hours without written permission of the Principal / Competent authority.
2. Students should be punctual in attending classes and other co-curricular and extra-curricular activities. Late comers will not be allowed in the class.
3. Students will be responsible for all equipment entrusted to them. Students should not cause any damage to any property, equipment, instruments, tools etc., of the College. An amount of Rs.150 towards General maintenance, is payable by each Student at the end of the Academic Year, prior to Examinations. In case of any damage, the actual cost will be recovered from the student along with a fine.
4. Students should take care of their belongings while within the campus. The College will not be responsible for any loss of such belongings.
5. Use of Mobile phones, Pagers, Cameras, etc., are prohibited inside the campus, during College hours, from 10am to 4pm. If found in contravention, they will be confiscated.

   Smoking and consumption of pan is prohibited inside the campus. Consumption of any intoxicants or drugs is totally prohibited, and will lead to immediate dismissal from the College.
6. Students should display their Identity Card prominently, while they are within the campus and while travelling in the College bus. The security staff will not permit any student inside the campus without their identity card.
7. All Students should dress in a presentable manner. T-shirts and sleeveless dresses are not permitted.
8. The management reserves the right to modify the class timings and schedule.
9. Students should not hold any meetings or collect any money from other students without proper permission from the Principal / HOD.
10. Students should not involve themselves in any political or religious activity inside the Campus.

    Ragging in any form is totally banned and is punishable as per the Government Order. If any student is found to be indulging in any sort of ragging or harassment to juniors or other fellow students, inside or outside the campus, bus, he/she will be dismissed immediately from the College, and criminal action will be taken against them as per the rules.
11. The following acts of misconduct will result in immediate dismissal from the College:

    (i) Assault of any person
    (ii) Willful damage to College property
    (iii) Intimidation, coercion and/or interference with other students
    (iv) Misbehavior with other students and/or Staff

12. The decision of the Principal decision is final and binding on all the students, in all matters pertaining to the College.
13. All other rules, regulations and guidelines prescribed by University / Government agencies will be implemented.
14. Attendance
    1. Absence from class without proper reason and without prior permission from the HOD is tantamount to breach of discipline and such absence will attract punishment and should be avoided. One period of absence in the forenoon or afternoon session will be treated as half a day of absence.
    2. Absence for more than 10 days without prior permission from the HOD may lead to removal from the nominal roll.
    3. Students appearing for the University examinations must have at least 80% of attendance as per the rules of the University. A minimum of 70% attendance is required to appear for examinations.

RULES OF CONDUCT AND DISCIPLINE

1. All students should conduct themselves with DECENCY, DECORUM and DIGNITY at all times and in all places.
2. Students must co-operate in protecting and taking care of all college property and equipments. They are expected to keep the building, playfield and their rooms neat and tidy.
3. Difficulties experienced by the students and suggestions for improving their welfare may be brought to the notice of the principal or any other staff member for consideration and necessary action.
4. Students who want to participate in matches and competitions not conducted by the college can do so only after getting the permission of the principal.
5. Students are forbidden from taking any part in political activities of any kind particularly those directed against the authority of the government.
6. Students who are found damaging college property will be expelled from the college. If any damage to the college property is caused by the student who is not identified minimum collective fine of Rs.100/- per student will be levied at the end of the year.

RULES REGARDING ATTENDANCE & LEAVE OF ABSENCE

1. A Candidates other then private one shall be required to put in seventy five percent to qualify for admission to any prescribed examination of the university.
2. If a student is absent for one or more hours during a session (Forenoon or afternoon) he/she will lose the attendance for half-a-day.
3. The Principal of the college shall have a power to condone shortage of attendance of students to be admitted for university examinations upto a maximum of a 10 percent, ie., nine days each semester on valid reasons as ill health etc., on payment of the prescribed condonation fee of Rs.500/-.

4. Statement of attendance of the students shall be displayed in the college notice board every month.
5. In case the shortage of attendance of a student exceeds the limit prescribed for purpose of condonation of attendance, he/she will not be presented to the University examinations.
6. A student will be given only one opportunity to carry forward the deficiency in attendance of one semester to the next semester during the degree course, failing which he/she will have to re-do the course.

DISCIPLINE REGULATIONS

The following rules shall be on force in the college as per the Tamilnadu Educational rules.

1. No Student who has been convicted of any offence in a criminal court will be allowed to continue his studies in the college.
2. Students should abstain from active participation in party or communal politics.
3. Students who indulge in political propaganda or who organize fellow students in to political factions in the premises of the college or who otherwise engage themselves in party politics are liable to be expelled from the college.
4. Principal or other constituted college authorities may frame and issue from time to time disciplinary rules of a permanent or temporary nature relating to the conduct, inside and outside the college premises, of students.
5. Principal and other constituted college authorities shall have full powers to inflict the following punishments in the interest of the students or of the institution concerned fine, denial of attendance, denial of terms certificates, suspensions and expulsion.
6. Students should not indulge in any activity leading to the disruption of peace and discipline and dislocation of normal work in the college premises. Those who are guilty of violation of this rule will be severely dealt with.
7. Ragging is strictly forbidden. Anyone who is guilty of ragging will be severely punished.
8. Students who are guilty of (a) rude language towards the staff of the college or (b) assault or attempt to assault the staff or fellow students of the college, will be expelled from the institution.

RAGGING – WARNING

- Ragging of any sort is banned.
- Ragging is illegal and punishable.
- Ragging in any form at any place in the college campus or outside is strictly prohibited.
- Ragging is punishable with imprisonment upto 7 years with a fine of Rs.25,000. Strict disciplinary action will be taken against any student found indulging in an act of ragging.

- Any complaint about ragging has to be reported to the respective HODs or authorities.
- Ragging of any sort will be informed to the Police authorities.

IDENTITY CARD

Every student will be provided with an identity card with his photo duly attested by the principal. Students are required to keep their identity card with them always.