GOVERNMENTARTSCOLLEGE (AUTONOMOUS)

SALEM – 636 007

NAAC Accredited "B++ Status"
(Affiliated to PeriyarUniversity)

B.Sc PHYSICS DEGREE
(Semester System)

Regulations and Syllabus

CHOICE BASED CREDIT SYSTEM

(From the Academic Year 2017 – 2018 onwards)

GOVERNMENTARTSCOLLEGE [AUTONOMOUS], SALEM-7.

(NAAC Accredited "B++ Status")
(Affiliated to PeriyarUniversity, Salem-11)
COMMON REGULATIONS OF ALL UG COURSES

1. Condition For Admission:

A candidate who has passed Higher Secondary examination with Mathematics, Physics, and Chemistry under higher secondary board of examination, Tamil Nadu or as per norms set by the Government of Tamil Nadu or an examination accepted as Equivalent thereto by the Governing board subject to such conditions as may be prescribed thereto are permitted to appear and qualify for the B.Sc., (Physics) degree examination of this Autonomous College after a course of study of three academic years.

2. Duration of the Course:

The course for the degree of Bachelor of Science shall consist of three academic years divided into six semesters.

3. Course of Study:

The course of study shall comprise instruction in the following subjects according to the syllabus and books prescribed from time to time.

(For candidates admitted from the Academic Year 2017 -2018 onwards)

Examination:

The theory examination shall be three hours duration to each paper at the end of each semester. The candidate failing in any subject(s) will be permitted to appear for each failed subject(s) in the subsequent examination.

The practical examinations for UG course should be conducted at the end of the even semester.

The examinations consist of Continuous Assessment (I.A) and Semester Examinations (S.E)

I.A Marks for Theory Papers are as follows:

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U.G. Attendance + Assignment + Test      = 25 Marks
        5      +      10    +  10   = 25 Marks
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For Attendance

75% - 80%	81% - 85%	86% - 90%	91% - 95%	Above95%
1 Mark	2 Marks	3 Marks	4 Marks	5 Marks

IA Marks for Practical Papers:
Attendance + Observations + Test
10   +   15   + 15   = 40Marks

Scheme of Examination: The scheme of examination is as per the course of study given above.

Question Paper pattern for Examination

Time : 3 Hrs.   Max. Marks – 75

Part A:10 x 2=20 Marks
(Answer all Questions)
(Two questions from each unit)

Part B: 5 x 5 =25 Marks
(Answer all Questions)
(One question from each unit with internal choice)

Part C: 3 x 10 = 30 Marks
(Answer any three Questions)
(One question from each unit with internal choice)

2. Question paper pattern for practical Examination:

Formula with explanation of symbols   10 Marks
Tabular Column/Circuit diagram if any   10 Marks
Observation with proper units   15 Marks
Calculations / Graphs   10 Marks
Results   5 Marks
Record Marks   10 Marks

                         Total 60 Marks
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3. Internal Assessment (I.A) for Practical Examination:

For Attendance

75% - 80%	81% - 85%	86% - 90%	91% - 95%	Above95%
2 Mark	4Marks	6 Marks	8 Marks	10 Marks

For Observations:
      15 Marks

For Test
      15 Marks

4. Passing Minimum:

The candidate shall be declared to have passed the examination if the candidates secure not less than 40 marks in the University semester examination in each course or practical. The candidate should get minimum 40 marks in S.E i.e., minimum 30 marks out of 75 in S.E and in total 40 marks including I.A out of 100 in theory courses.(No passing minimum for I.A.)

For the Practical courses, the distribution of marks will be I.A 40, practical 60(Practical 50+ Record 10). The candidate should get a minimum of 24 out of 60 in practical examination. The practical mark 50 and the record mark will be taken together as 60 marks for practical examinations. No passing minimum for record note book. .(No passing minimum for I.A.)

However submission of record note books is a must in the practical examinations.

5. Classification of Successful Candidate:

Letter Grade	Cumulative Grade Points Average	Grade Description	Range of Marks*
S	10	Outstanding	90-100
A	9	Excellent	80-89
B	8	Very Good	70-89
C	7	Good	60-69
D	6	Average	50-59
E	5	Satisfactory	40-49
RA	0	Re-Appear	0-39

A candidate is deemed to have completed a course successfully and earned the appropriate credit, only if, the candidate earned a grade of E and above. RA denotes the candidate should Reappear the course again.

GP = (Marks obtained in course x credit) /100

$$GPA = \frac{\text{Total Grade Points earned in a semester}}{\text{Total credits registered in a Semester}}$$

$$CGPA = \frac{\text{Sum of Grade Points earned}}{\text{Sum of credits registered}}$$

Classification

CGPA	**9 and above**	I Class with Distinction
CGPA	**between 7 and 8.9**	I Class
CGPA	**between 5 and 6.9**	II Class

Note:

The above classification shall be given for

➢ Over all performance including Non – Major Electives and Skill based Courses.

➢ For Performance in the Part III only.

6. Maximum Duration for the completion of the UG Programme:

The maximum duration for completion of the UG programme shall not exceed twelvesemesters.

7. Commencement of this Regulation:

These regulations shall take effect from the academic year 2013 – 14i.e, for students who are to be admitted to the first year of the course during the academic year 2017 -2018and thereafter.

8. Transitory Provision:

Candidates who were admitted to the UG course of study before 2013–2014shall not bepermitted to appear for the examinations under these regulations.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS) SALEM – 7
B.Sc DEGREE PHYSICS MAJOR
Course Structure under CBCS
(For candidates admitted from the academic Year 2017 -2018onwards)

Sem	PART	STUDY COMPONENTS	COURSE CODE	TITLE OF THE COURSE	Instr Hour / week	Credits	IA	SE	TOTAL
I	I	Tamil Language course I	17FTL01	Tamil paper 1	6	3	25	75	100
	II	English language course -I	17FEL01	English paper I	6	3	25	75	100
	III	Core course I	17UPY01	Mechanics and sound	4	4	25	75	100
		Core course Practical - I (Extended to II semester)	17UPYP I	Major practical-I	3				
		First Allied course I	17AMT01	First Allied theory paper-I	6	3	25	75	100
		First Allied course –II (Extended to II semester)	17AMT02	First Allied theory paper-II	3				
	IV	Value Based Education	17UVABE	Theory Paper	2	2	25	75	100
II	I	Tamil Language course II	17FTL02	Tamil paper -II	6	3	25	75	100
	II	English language course -II	17FEL02	English paper II	6	3	25	75	100
	III	Core course -II	17UPY02	Heat, Thermodynamics and statistical physics	4	5	25	75	100
		Core course Practical I (Extended from the I semester)	17UPYP1	Major practical-I	3	4	40	60	100
		First Allied course II (Extended from I semester)	17AMT02	First Allied theory paper-II	3	3	25	75	100
		First Allied course III	17AMT03	First Allied theory paper-III	6	4	25	75	100
	IV	Environmental Studies	17UENST	Environmental Studies	2	2	25	75	100
III	I	Tamil Language course III	17FTL03	Tamil paper III	6	3	25	75	100
	II	English language course -III	17FEL03	English paper III	6	3	25	75	100
	III	Core course III	17UPY03	Properties of Matter	3	5	25	75	100
		Core course Practical II (Extended to IV semester)	17UPYP2	Major practical-II	2				
		Second Allied course I	17ACH01	Second Allied theory paper-I	6	3	25	75	100
		Second Allied Course Practical (Extended to IV semester)	17ACHP1	Second Allied Practical paper-I	3				
	IV	Non Major Elective I	17UNME1	General knowledge and current affairs	2	2	25	75	100
		Skill Based Elective I	17UPYS1	Astronomy and Astro Physics	2	2	25	75	100

IV	I	Tamil Language course IV	17FTL04	Tamil paper IV	6	3	25	75	100
	II	English language course -IV	17FEL04	English paper IV	6	3	25	75	100
	III	Core course IV	17UPY04	Optics and Fibre Optics	3	5	25	75	100
		Core course Practical II (Extended from III semester)	17UPYP2	Major practical-II	2	4	40	60	100
		Second Allied course II	17ACH02	Second Allied theory paper-II	6	3	25	75	100
		Second Allied Practical course I (Extended from III semester)	17ACHP1	Second Allied Practical paper-I	3	4	40	60	100
	IV	Non Major Elective II	17UNME2	General knowledge and current affairs	2	2	25	75	100
		Skill Based Elective II	17UPYS2	Programming in C language	2	2	25	75	100
		Extension Activities	17UEAXT			1			
V	III	Core course - V	17UPY05	Electricity and Electromagnetism	5	5	25	75	100
		Core course - VI	17UPY06	Basic Electronics & Digital Electronics	5	5	25	75	100
		Core course - VII	17UPY07	Atomic Physics	5	5	25	75	100
		Core course Practical III (Extended to VI semester)	17UPYP3	Major practical-III	3				
		Core course Practical IV (Extended to VI semester)	17UPYP4	Major practical-IV	3				
		Major Based Elective I	17UPYM1	Numerical Methods	5	5	25	75	100
	IV	Skill Based Elective III	17UPYS3	Electronic Devices	2	2	25	75	100
		Skill Based Elective IV	17UPYS4	Fundamentals of Computers	2	2	25	75	100
VI	III	Core course - VIII	17UPY08	Nuclear Physics	5	5	25	75	100
		Core course - IX	17UPY09	Quantum Mechanics and Relativity	5	5	25	75	100
		Core course Practical III (Extended from V semester)	17UPYP3	Major practical-III	3	4	40	60	100
		Core course Practical IV (Extended from V semester)	17UPYP4	Major practical-IV	3	4	40	60	100
		Major Based Elective II	17UPYM2	Solid State Physics	5	5	25	75	100
		Major Based Elective III	17UPYM3	Electronics and Communications	5	5	25	75	100
	IV	Skill Based Elective V	17UPYS5	Electrical Appliances	2	2	25	75	100
		Skill Based Elective VI	17UPYS6	8085 Microprocessor and Applications	2	2	25	75	100
		TOTAL				140			**4000**

(For candidates admitted from 2017 -2018onwards)

GOVERNMENTARTSCOLLEGE (AUTONOMOUS), SALEM-636 007

B.Sc. Physics

Semester I

Instructional hours : 4

Credits : 4

Core Course   : MECHANICS AND SOUND
Course Code   : 17UPY01

Learning Objectives:

- To obtain the knowledge about the projectiles, laws of impact , dynamics and sound principles and its applications.

- Effect of center of gravity and friction aspects between the objects.

- To gain the knowledge about production of ultrasonic and acoustics of buildings.

Learning Outcomes:

1. Practical applications acoustics of building in day to day life is experienced

2. Gained the knowledge of gravitational force in earth.

3. Practical application and the knowledge of gravitational force and finding 'g' by using compound pendulum

UNIT – I

PROJECTILE: Range up and down of an inclined plane-maximum range-two direction of projection for a given velocity and range.

IMPACT: Laws of impact – coefficient of restitution –impact of a smooth sphere on a fixed smooth plane-Direct impact between two smooth spheres-Losses in kinetic energy in direct and oblique impact.

UNIT – II

SHM: Definition -Composition of two SHM's of same period along a straight line and at right angles to each other-Lissajous figures.

DYNAMICS OF RIGID BODIES: Compound pendulum-theory-condition for minimum period – interchangeability of center of suspension and center of

oscillation – Determination of g using compound pendulum-Bifilar pendulum-parallel and non-parallel threads.

UNIT – III

CENTER OF GRAVITY: Center of gravity of a solid cone, Solid hemisphere and Hollow hemisphere.

FRICTION: Laws of friction-angle of friction-resultant reaction and cone of friction-equilibrium of a body on an inclined plane under the action of a force.

CENTER OF PRESSURE: Definition-center of pressure of a rectangular lamina and triangular lamina.

ATMOSPHERIC PRESSURE: Variation of atmospheric pressure with altitude-height of homogenous atmosphere.

UNIT – IV

SOUND : Definition of free, damped and forced vibrations – Theory of forced vibrations - Resonance - Sharpness of resonance - Fourier's theorem - application for Saw- tooth wave and square wave. - Sonometer - determination of A.C. frequency using sonometer - Determination of frequency using Melde's apparatus.

UNIT – V

ULTRASONICS : Ultrasonics - production - piezo electric method –magneto-striction method - detection - properties - applications.

ACOUSTICS : Acoustics of buildings - reverberation time - derivation of Sabine's formula - determination of absorption coefficient-factors affecting the acoustics of buildings-requisites for good acoustics.

Books for Study:

1.Mechanics and Mathematical Methods(2005)   by R.Murugesan. S.Chand and Co.

2.Dynamics by M.Narayanamurti and M Nagarathnam. (2005) The National Publishing Co.

3.Statics, Hydrostatics and Hydrodynamics. (2005) By M.Narayanamurti and M.Nagarathnam.The National Publishing Co.

4. Properties of matter and Acoustics. (2005) By R.Murugesan.S.Chand and Co.

5. A Text Book of Sound (2005) By N. Subrahmanyam and BrijlalS.Chand and Co.,

Books for Reference:

1.Mechanics (2005)by D.S.Mathur.S.Chand and Co.,

2.Sound by Khanna and Bedi. (2005) Atmaram and Sons.

3.A Text Book of Sound(2005) By M.Ghosh.S.Chand& Co.

Instructional hours : 4

Credits : 5

Core Course : HEAT, THERMODYNAMICS AND STATISTICAL PHYSICS
Course Code : 17UPY02

Learning Objectives:

Scope of the syllabus is structured based on specific aims and objectives as follows:

- To study of the basic nature of heat and temperature in perspective of dynamics.
- To equip the knowledge of working principle of calorimeter.
- To make aware of Maxwell's thermodynamics relations.

Learning Outcome

- The extensive study of calorimetric devices and its application.
- knowledge about Comparison of three statistics
- The practical application of low temperature physics - Refrigerators – Air condition machines.

UNIT – I

THERMOMETRY AND CALORIMETRY

Platinum resistance thermometer - Thermo electric thermometers – Absolute Zero and Ice point – Definition of specific heat capacity - method of mixtures - determination of specific heat capacity of a liquid by Newton's law of cooling – Two Specific Heats of a gas – determination of $C_v$byJoly's differential steam calorimeter - $C_p$byRegnault's method –Ratio of C_p and C_v -Mayer's relation – Dulong and Petit's Law.

UNIT – II

LOW TEMPERATURE PHYSICS

Vander waal's equation of gaseous state- Determination of critical constants – Joule -Thomson effect –Porous plug experiment - theory - calculation of

temperature of inversion – relation between Boyle temp., Temp. of inversion and Critical temp. Liquefaction of Helium - Adiabatic Demagnetisation (Derivation) – Properties of Helium I and Helium II – practical applications of low temperatures - Refrigerators .

UNIT – III

THERMODYNAMICS

Zeroth, first and second law of thermodynamics – Adiabatic and isothermal processes - Carnot cycle and its efficiency - Carnot's theorem - reversible and irreversible processes – Heat engines – Carnot's petrol and diesel engines – their efficiency - entropy – change in entropy in reversible and irreversible processes – Third law of thermodynamics – temperature - entropy diagram.

UNIT – IV

MAXWELL'S THERMODYNAMICAL RELATIONS

Zero point energy – Derivations of Maxwell's thermodynamic relations – applications - Helmholtz function - Gibb's function - Enthalpy - Relation between specific heats and joule – Kelvin coefficient - Clausius - Clapeyron's latent heat equation – T dS equations.

UNIT – V

STATISTICAL PHYSICS

Phase space – Statistical Equilibrium – Microstates and Macrostates – Maxwell – Boltzmann statistics – Application of MB statistics to molecular energies in an ideal gas – BE statistics- Application of BE statistics to photon gases – FD statistics – Application of FD statistics to electron gas – Comparison of three statistics.

Books for Study:

1.Brijlal and Subramaniam, Heat and Thermodynamics, S. Chand & Co.,
New Delhi 2004.

2.D.S. Mathur, Heat and Thermodynamics, S. Chand & Co. New Delhi 2004.

3. R. Murugeshan and Er. KiruthikaSivaprasath, Thermal Physics, S. Chand & Co., New Delhi 2004

Books for Reference:

1. J.B. Rajam and C.L., Arora, Heat and Thermodynamics, S. Chand & Co, New Delhi, 2004.

2. A.B. Gupta and H. Roy, Thermal Physics, Allied Books, New Delhi. 2002.

3. Gupta, Kumar &Sharma - Statistical Mechanics,

GOVERNMENTARTSCOLLEGE (AUTONOMOUS), SALEM-636 007

(ForB.ScMaths/Chemistry/Applied Geology Core Course Candidates)

Semester I/III

Instructional hours : 6

Credits : 3

Allied Course   : Allied Physics - I
Course Code   : 17APY01

<u>Learning objectives</u>

- Apply the basic law of physics in the area of mechanics, newton gravitation

- To identity classification of sound based on frequencies.

- To identity all properties of matter existing in the universe.

<u>Learning Outcome</u>

- The extensive study of calorimetric devices and its application.

- knowledge about application of ultrosonics.

- The practical application of electricity and magnetism

UNIT – I

Mechanics

Range up and down of an inclined plane-maximum range-two directions of projection for a given velocity and range.

Laws of impact – coefficient of restitution –impact of a smooth sphere on a fixed smooth plane-Direct impact between two smooth spheres-Loss in kinetic energy in direct impact.

Compound Pendulum – Theory - determination of acceleration due to gravity.

UNIT – II

Sound

Ultrasonics - Production - Piezo electric method –Magnetostriction method - detection - properties - applications

Acoustics of buildings- reverberation-reverberation time – Derivation of Sabine's formula - absorption Coefficient - condition for good acoustics.

Vibrations in strings-Laws of Transverse vibrations-determination of frequency of A.C mains using Sonometer.

UNIT – III

Properties of Matter

Newton's law of gravitation-Determination of gravitational constant-Boy's method.Bending of beams-expression for the depression of the free end of the cantilever-Non-uniform and uniform bending-theory and experiment–torsion - Expression for couple per unit twist-Torsion pendulum-theory –determination of rigidity modulus of a thin wire- determination of rigidity modulus of a rod by static torsion - Surface tension and interfacial surface tension drop weight method.

UNIT – IV

Heat

Specific heats: Determination of $C_p$byRegnault's method and $C_v$byJoly's differential Steam Calorimeter – Vander Waal's equation(No derivation) of state–Criticalconstants and their determination – Expressions for Critical constants – Thermal conductivity of a bad conductor – Lees' disc method.

Joule-Thomson effect – Porous plug- Theory- experiment – Inversion temperature.

UNIT – V

Electricity & Magnetism

Carey Foster's Bridge -Principle of Potentiometer-Calibration of low range voltmeter - Calibration of ammeter-Biot-Savort's Law-Fleming left hand rule and Right hand rule -Moving coil Ballistic Galvanometer - Theory ofcharge sensitivity – Determination of current and voltage sensitivities - Comparison of capacitance of two capacitors.

Magnetic Properties of materials – Comparative study of dia,paraandferro magnetic materials.

Books for Study and References:

1. Mechanics and mathematical methods- R Murugesan, S Chand & Co.
2. Sound- Brijlal and Subramaniam, S Chand & Co.
3. Properties of matter and acoustics- R Murugesan, S Chand & Co.
4. Heat and Thermodynamics- Brijlal and Subramaniam, S Chand & Co.
5. Electricity and Magnetism- R Murugesan, S Chand & Co.
6. Sound – R.L.Saigal – S.chand& Co. Delhi.
7. Properties of matter – D.S.Mathur.
8. Heat – Narayanamurthi and Nagarathinam.
9. Allied Physics – I – A. Sundaravelusamy.

GOVERNMENTARTSCOLLEGE (AUTONOMOUS), SALEM-636 007

(ForB.ScMaths/Chemistry/Applied Geology Core Course Candidates)

Semester II/IV

Instructional hours : 6

Credits : 3

Allied Course   : Allied Physics - II
Course Code   : 17APY02

Learning objectives

- To understand the students about the Photoelectric Effect, Compton Effect and methods of determination of isotopes.

- To enlighten the students' knowledge of basic and digital electronics.

Outcome

- The syllabus can help the students to perceive knowledge about atomic and nuclear physics.

- The acquisition of Practical knowledge in basic and digital electronics through this syllabus.

UNIT – I

Atomic physics

Photo Electric Effect – Laws of Photo Electric Effect –Einstein Photoelectric Equation – Millikan's Experimental Verification – Photo electric cells and its application – X-ray production and properties - Compton's effect.

Vector Atom Model – Quantum Numbers Associated with Vector Atom Model – Pauli's Exclusion Principle – Excitation and ionization Potentials – Stark Effect – Zeeman Effect (Qualitative Study Only).

UNIT – II

Nuclear Physics

Radio activity – Nature of Alpha, Beta, Gamma rays – mass defect– Binding Energy – Packing fraction – Nuclear Models – Liquid Drop Model – Nuclear Shell Model (Evidences).

Solid state detector – Proportional counter - Nuclear Fission and Fusion - Chain Reaction – Solar Energy – pp cycle-CN cycle.

UNIT – III

Optics

Interference – Air wedge – Thickness of a wire –Newton's Rings – Theory - determination of radius of curvature - Diffraction by Plane Transmission Grating (N slits) – Polarization - optical activity – Determination optical activity by Laurent's half shade polarimeter

Laser – Properties –Population inversion – Ruby Laser - Semi Conductor Laser - Applications of Laser

UNIT – IV

Basic Electronics

Zener Diode – Voltage Regulator – Types of transistor connections (CC,CB,CE) – Characteristics in CE mode -Principle of Feed Back - Oscillator – Colpitt's Oscillator and Hartley Oscillator - construction and working – Operational Amplifier as a Adder–Subtractor– Integrator – Differentiator.

UNIT – V

Digital Electronics

Number systems and their conversion (Binary, Octal, Decimal & Hexadecimal)-Elementary Ideas of AND, OR, NOT and EX-OR Gates – NAND / NOR Gate as (AND, OR, NOT) Universal Building Blocks – Boolean Algebra – De Morgan's Theorem – Verification – Half Adder and Full Adder – Fabrication of (monolithic) ICs – advantages.

Books for Study and References:

1. Modern Physics – R. Murugesan, S. Chand & co.
2. Basic Electronics – (SolidState), B.L. Theraja , , S. Chand & co.
3. Digital Electronics –And Application, Malvino and Leach, TMh.
4. Optics - R. Murugesan, S. Chand & co.
5. Basic Electronics 6th Edition By B. Grob, McGraw – Hill 1989.

GOVERNMENTARTSCOLLEGE (AUTONOMOUS), SALEM-636 007

B.Sc PHYSICS

Semester II

Instructional hours : 3

Credits : 4

Core Course   : Major Practical - I
Course Code   : 17UPYP1

Learning objectives

- The students to continue the development of their expertise in applying physical concepts to practical problems and in learning about experimental techniques and advanced equipment.

- The experiments complement some of the material covered in the theory courses, but the course can be taken independently.

Learning outcome

• Asses the possible hazards of conducting experiments and carry them out safely

• Acquire the appropriate data accurately and keep systematic record of your laboratory activities

•Interpret your findings using the correct physical scientific framework

•Communicate the findings succinctly using formal reports

•Use software packages to acquire, interpret and present experimental results

Any Sixteen of the following:

1.Young's modulus – Non uniform Bending – Pin & Microscope method-Determination of unknown mass

2.Young's modulus – Non uniform bending – Scale and Telescope method (two lengths)

3.Torsion pendulum - Rigidity Modulus (without mass)

4.Compound pendulum- Determination of g

5.Surface tension and interfacial surface tension – Drop Weight method

6.Sonometer - frequency of a tuning fork

7.Sonometer -Relative Density of a solid & liquid.

8.Sonometer – frequency of AC mains.

9.Specific heat capacity of a liquid – Method of a mixtures – half time correction

10.Spectrometer – Refractive index of a solid Prism

11.Spectrometer i – d curve

12.Spectrometer – Grating – Standardization – normal incidence- Measurement of Wavelength of Mercury Spectrum

13.Potentiometer – Calibration of low range Voltmeter

14.Figure of merit of a Sensitive Galvanometer.

15.Field along the axis of a coil – Deflection magnetometer – B_H

16.Post Office   Box – Temperature coefficient of resistance

17. Characteristics of PN junction diode

18.Zener diode – Voltage regulator

19.Verification of Basic logic gates – Using ICs.

20.NAND/NOR gate as Universal Building Block

Instructional hours : 3

Credits : 3

Allied Course   : Allied Physics Practical- I
Course Code   : 17APYP1

Learning objectives

- The students to continue the development of their expertise in applying physical concepts to practical problems and in learning about experimental techniques and advanced equipment.

- The experiments complement some of the material covered in the theory courses, but the course can be taken independently.

Learning outcome

• Asses the possible hazards of conducting experiments and carry them out safely

• Acquire the appropriate data accurately and keep systematic record of your laboratory activities

•Interpret your findings using the correct physical scientific framework

•Communicate the findings succinctly using formal reports

•Use software packages to acquire, interpret and present experimental results

1. Young's modulus – Non uniform bending – Scale and Telescope

2. Young's modulus – Uniform bending – Scale and Telescope

3. Torsion pendulum – Rigidity Modulus of a wire

4. Compound pendulum – Determination of g.

5. Surface tension and Interfacial surface tension – Drop weight method

6. Specific heat capacity of liquid – method of mixtures – Half time radiation correction

7. Sonometer – frequency of   AC mains.

8. Air Wedge – thickness of a thin wire.

9. Newton's Rings – Radius of curvature of   convex lens.

10. Potentiometer – Calibration of low range Voltmeter

11. Potentiometer – Calibration of   Ammeter

12. Figure of merit of a Sensitive Galvanometer.

13. Field along the axis of a coil – Deflection Magnetometer - B_H

14. Voltage Regulator using IC.

15. Verification of basic Logic gates – using IC

Syllabus under CBCS
PART-IV
Value Education - (CBCS)
First Year- I Semester
(Common for all U.G. Courses)

Course Code : CBUVABE   **Credits : 2   (per week - 2 hrs)**

UNIT - I:Concept of Human Values, Value Education. Towards Personal Development

Aim of education and value education; Evolution of Value oriented education; Concept of Human values; types of values; Components of value education.

Personal Development:

Self analysis and introspection; sensitization towards gender equality, physically challenged, intellectually challenged. Respect to-age, experience, maturity, family members, neighbors, co-workers.

Character Formation Towards Positive Personality:

Truthfulness, Constructivity, Sacrifice, Sincerity, Self Control, Altruism, Tolerance, Scientific Vision.

UNIT - II: Value Education Towards National and Global Development National and International Values:

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.

UNIT - III:

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 : Impact of Global Development on Ethics and Values

Conflict of cross-cultural influences, mass media, cross-border education, materialistic values, professional challenges and compromise.

Modern Challenges of Adolescent Emotions and behaviour, Sex and spirituality; Comparison and competition; positive and negative thoughts,

Adolescent Emotions, arrogance, anger, sexual instability, selfishness, defiance.

UNIT - V :Theraupatic Measures

Control of the mind through

a. Simplified physical exercise

b. Meditation-Objectives, types, effect on body, mind and soul

c. Yoga-Objectives, Types, Asanas

d. Activities:

    (i) Moralization of Desires

    (ii) Neutralization of Anger

    (iii) Eradication of Worries

    (iv) Benefits of Blessings

QUESTION PAPER PATTERN

Semester Examination question paper should carry 75 marks. Part-A, Answer all the questions: (10x2=20) Part-B, Answer all the questions (in built choice) (5x5=25) Part-C, Essay type-Answer any 3 questions out of 5 (3x10=30)

Internal assessment marks - 25

REFERENCE:

1. Value Education for Health, Happiness and Harmony, The World Community Service Centre Vethari Publication Rs. 35/- (for All Units)

2. Philosophy of Universal Magnetism (Bio-magnetism, Universal Magnetism) The World Community Service Centre Vethari Publication (for Unit IV)

3. Thirukkural with English Translation of Rev. Dr. G.U. Pope, Uma Publication, 156, Scrfoji Nagar, Medical College Road, Thanjavur- 613 004. (for All Units)

GOVERNMENTARTSCOLLEGE (AUTONOMOUS), SALEM-636 007

Syllabus under CBCS

(Common Course for B.A/ B.Sc./ B.Com./ B.B.A./ B.C.A Degree Examinations)

PART -IV

ENVIRONMENTAL STUDIES

Second Semester

Course Code: CBUENST   **Credits : 2**

UNIT - 1 Natural resources

Definition, scope, importance and public awareness.

Forest resources: Deforestation, mining, dams and their effects on forest.

Water resources: Utilization of surface and ground water, floods, benefit and problems.

Mineral resources: Environmental effects of extracting and using mineral resources.

UNIT - 2 Ecosystems

Concept, structure and functions of ecosystem.

Producers, consumers and decomposers.

Energy flow in the ecosystem.

Ecological succession.

Food cham, food webs and ecological pyramids.

Outline of important ecosystem.

UNIT - 3 Biodiversity and pollution

Threats to Biodiversity: Habitat loss poaching of wildlife, man wild life conflicts.

Endangered and endemic species of India.

Environmental Pollution: Causes, effects and control measures. Role of an individual in the prevention of pollution of Air, water and soil.

Solid waste management: causes, effects andcontrol measures of urban and industrial wastes.

Disaster management: Floods, earthquake, cyclone and landslides.

UNIT - 4 Social issues and the environment

From unsustainable to sustainable development.

Environmental ethics: Issues and problem — solutions.

Climate change global warming, acid rain, ozone layer depletion.

UNIT - 5 Population issues and Legislation

An Outline of Environmental Pollution Act.

Population explosion and problems.

Environment and human health.

REFERENCE BOOKS

1. Miller T.G., Jr. Environmental Science, Wadsworth Publishing Co, (TB).

2.A text book of Environmental studies - P. Arul - Environmental Agency Chennai - 42.

3. Environmental Science — P.D.Sharma.

4. Arunachalam, N. ct al (2000). Environmental Science & Engineering, Charulatha Publications, Chennai.

5. Kumaraswamy, K, et al (2000). Environmental Studies, Bharathidasan University, Trichy -24.

6. Editorial board, Periyar EVR college professors, Environmental studies, Trichy - 23.

GOVERNMENTARTSCOLLEGE (AUTONOMOUS), SALEM-636 007

(Common Course for B.A/ B.Sc./ B.Com./ B.B.A./ B.C.A Degree Examinations)

THIRD SEMESTER

Non Major Elective Course - I

GENERAL KNOWLEDGE AND CURRENT AFFAIRS- I

Course Code: CBUNME1   **Credits: 2**

UNIT I: Indian Freedom struggle

Revolt of 1857 - Causes and its failure ; Gandhian Era - Satyagraha - Non violent and Non Co-operation movement - Simon Commission - Civil disobedience movement - First round table conference - Gandhi Irwin Pact - Second round table conference - Third round table conference -Cripps Mission - Quit India Movement - Indian National Army - Declaration of Indian Independence.

UNIT II: Indian Polity and Tamil Literature

The Constitution of India - Preamble - Fundamental rights - Directive Principles - Distinction between Fundamental rights and Directive principles - Fundamental Duties.

Tamil IlakkiyaVagaigal, IlakkanaNoolgal, 20thCentuary Tamil Writers and Poets.

UNIT III: Government Machinery

The President - Mode of election - Powers and Duties of President; Vice President - Mode of election Union Council of Ministers - Prime Minister - Parliament - LokSabha- RajyaSabha - Supreme Court - Governor - Chief Minister - Council of Ministers - Legislative Assembly and Council.

UNIT IV: Indian Geography

Physical features of India:- Himalayas - Northern Plains - The Deccan Plateau - Coastal plain - Deccan mountains. *Major River System of India* - Rivers falling into the Arabian sea :- The Indus - The Narmada - The Tapti ; Rivers falling into the Bay of Bengal :- The Ganga - The Yamuna - Mahaiiathi - The Brahmaputra - The Godavari - The Krishna - The Cauvery. *Soils of India :-*Alluvial Soil - Black Soil - Laterite Soil - Desert Soil.

UNIT V: Basic Sciences

Newton's Laws of Motion - Ohm's law - Faraday's law of electromagnetic induction - Structure of atom - Applications of Radio activity - General account of

PlantKingdom :-Bacteria - Virus Algae - Fungi ; Animal Kingdom :- Protozoa - Metazoa ; Types of Nutrition; Definitions, Classification, Examples and Uses of Carbohydrate - Proteins - Fats - Vitamins; Types of rocks - Igneous, sedimentary, metamorphic rocks.

Reference Books:

1.Manorama Year Book 2009, 2010. Publishers MalayalaManorama (English and Tamil Version)

2. Sura's Year Book 2009, V.V.K. Subburaj, PublishersSuraCollege of Competition, Chennai.

3. General Knowledge Digest 2009, Krishna Reddy, Tata McGraw-Hill Publishing Co., New Delhi.

4. The Pearson General Knowledge Manual 2009, Edgar Thorpe &Showick Thorpe, Publishers -Pearson Education.

5. Sakthi's General Knowledge Year Book 2009, Sakthi Publishing House, Chennai.

GOVERNMENTARTSCOLLEGE (AUTONOMOUS), SALEM-636 007

(Common Course for B.A/ B.Sc./ B.Com./ B.B.A./ B.C.A Degree Examinations)

FOURTH SEMESTER

Non Major Elective Course - II

GENERAL KNOWLEDGE AND CURRENT AFFAIRS- II

Course Code: CBUNME2 **Credits: 2**

UNIT - I: Parts of Speech in English and Ancient Indian History

Definition and example of Noun, Verb, Adjectives.

IndusValley Civilization:- Origin - extent - Important Sites - Town Planning - Economic life ; Maurya empire:- Ashoka - Administration - Art.

UNIT -II: Medieaval and Modern Indian History

Administration, Art and Literature of the Cholas - Art and Architecture of Delhi Sultanate - Outline of Mogul Administration and Culture - Education Policy during British rule.

UNIT - III: Indian Economy

Outline of Economic Planning - National Income - Money and Banking - Important Committees in Indian Economy - Important Economic terms - Industrialization - Agricultural development Definition of shares, debentures, stock exchange, SEBI-NSE.

UNIT - IV: Everyday Science

Definition of the following :- Alternating current - Angiosperms - Antiseptic - Artificial respiration Blood groups – Bloodpressure - Chromosomes - Hardwater - Heavywater - Infrared rays - Nuclear reactor - Tetanus - TNT - RDX - DNA - AIDS - HIV is Swine flu - A(H1N1) Virus- Global warming and climate changes.

UNIT - V: Current affairs

UNO:-UNESCO- WHO-Common Wealth Countries - SAARC - Well known Indian Scientist - Worlds Prominent Scientists - Important Indian Personalities - Important Historical and Tourist Places in India - Classification and Parts of Computer - National Awards :- Bharat Ratna - Padma awards - Gallantry awards - Bravery awards ; International awards :- Nobel Prize - Magsaysay awards - Oscar awards ; Youth affairs and Sports :- Olympic games – Asian games - Common wealth games.

Reference Books:

1. Manorama Year Book 2009, 2010. Publishers Malaya!aManorama (English and Tamil Version)

2. Sura's Year Book 2009, V.V.K. Subburaj, PublishersSuraCollege of Competition, Chennai.

3. General Knowledge Digest 2009, Krishna Reddy, Tata McGraw-Hill   Publishing Co., New Delhi.

4. The Pearson General Knowledge Manual 2009, Edgar Thorpe &Showick Thorpe, Publishers -Person Education.

5. Sakthi's General Knowledge Year Book 2009, Sakthi Publishing House. Chennai.

Instructional Hours : 3

Credits : 5

Core Course - III: PROPERTIES OF MATTER

Learning objectives

- The students will learn all physical properties of matter through an activity based.
- Student will describe the specific physical properties of all matter.
- Though completing the challenge students will able to identify and describe properties of matter.

Learning outcomes

- The students will be able to utilize modern physical principle to describe physical structure and reactivity of matter.

- The student able to define matter and differentiate three states of matter- solid , liquid and gas.

Course Code: 17UPY03

UNIT I - ELASTICITY:

Hooke's Law - Definition of three moduli of elasticity and Poisson's ratio – Relation between elastic constants - Bending of beams - expression for the bending moment – uniform and non-uniform bending - theory and experiment (pin and microscope) - Expression for the depression of the loaded end of a Cantilever (static) -Torsion - expression for couple per unit twist - Torsional pendulum - theory -determination of rigidity modulus -Static torsion method.

UNIT II - GRAVITATION

Gravitation - Newton's law of gravitation - determination of gravitational constant - Boy's method- Mass and Density of earth - Expression for gravitational potential at a point- Gravitational potential and field due to a spherical shell and a solid sphere -Variation of g with latitude, depth and altitude.

UNIT III - SURFACE TENSION:

Definition and dimensions of surface tension - Excess of pressure inside a curved liquid surface-Jaegar's method - experimental study to find surface tension and variation of surface tension with temperature - surface tension and interfacial surface tension by drop weight method -Determination of surface tension by capillary rise method.

UNIT IV - VISCOSITY:

Co-efficient of viscosity and its dimensions - Derivation of Poiseuille's formula - Determination of Coefficient of viscosity of a liquid by Poiseuille's method - comparison of viscosities by Oswald's viscometer - viscosity of a highly viscous liquid - Searle's viscometer - Variation of viscosity of a liquid with temperature - Factors affecting viscosity

UNIT V - DIFFUSION & OSMOSIS

Diffusion - Graham's laws of diffusion - Fick's laws of diffusion -Determination of diffusivity - Graham's law of diffusion of gases - effusion of gases - transpiration.

Osmosis - experimental determination of osmotic pressure - laws of osmotic pressure -osmosis and vapour pressure of a solution - osmosis and boiling point of a solution - osmosis and freezing point of a solution.

BOOKS FOR STUDY:

1.Properties of matter by R. MurugesanS.Chand and Co.,(2005)

2. Properties of matter by Brijlal and N.Subrahmanyam. S. Chand and Co., (2005)

3. Elements of properties of matter by D.S.Mathur and S.Chand and Co.,

BOOKS FOR REFERENCE:

1. Fundamentals of General Properties of Matter by H.R. GulatiS.Chand and Co.,(2005)

2. Properties of Matter by SubramaniyaIyer, Rangarajan and Viswanathan (2005)

Instructional Hours : 2

Credits   : 2

Skill Based Elective -1: ASTROPHYSICS

Course Code : 17UPYS1

Learning objective

- Astrophysics requires in-depth study of application of physics and mathematics to astronomy

- Physics governing the universe such as asteroid, galaxy cluster and cosmology.

Learning Outcoms

- Students interested in gaining exposure to astrophysics as a supplement to a different major may consider the minor in astronomy or minor in astrophysics.

- Students will carry out and analyze astronomical observation and gain knowledge about celestial bodies.

Unit I:

Solar system - Planets - motion of planets - Lunar and Solar Eclipses - minimum and maximum number of eclipses at a node.

Unit II:

Small bodies in the solar system-Asteroids — meteors and meteorites - Comets - Satellites and its types —Astronomical Telescopes- Reflecting Telescope, Refracting Telescope and Radio Telescope.

Unit III:

Stars - Evolution of Stars, Classification of Stars, Luminosity of a star, Neutron stars - Chandrasekar Limit - Black holes - White dwarfs –Electron in a white dwarf stars.

Unit IV:

Sun - Solar activity - Sunspots — Solar atmosphere - Corona of the Sun - solar prominences - Aurora.

Unit V :

Universe - Galaxies - Milky way - Expansion of Universe - Hubble's Law -Steady state - Big bang theory - Space travel.

Text Books :

1. The Fascinating Astronomy by P.DevadasTelescoptics, Guindy, Chennai, 2000.

2. Physics of the Universe by A.Hewish CSIR Publication, New Delhi, 1995.

REFERENCE BOOK

1. Astrophysics of the Solar System by K.D. Abhyankar, University Press.

2. The Great Universe by G.K. Sasidharan, S. Chand & Company LTD.

GOVERNMENTARTSCOLLEGE [AUTONOMOUS], SALEM-7

B.Sc. Physics

IV SEMESTER

Instructional Hours :3

Credits   :5

Core Course - IV: OPTICS AND FIBRE OPTICS

Course Code   :   17UPY04

Learning objective

- To understand the optical phenomena such as interference , diffraction and polarization

- To understand the mode of communication through fiber optics\

Learning outcomes

- The student will able to determine thickness of thin wire by using interference concept.

- to construct block diagram of fiber optic communication system

- mention the sources which are used for the transmission of optical signals.

UNIT I - GEOMETRICAL OPTICS:

Convex lens - Newton's formula for a convex lens system - power of a thick lens - Narrow-angled Prism - Cauchy's formula - Dispersion without deviation and deviation without dispersion - Direct vision spectroscope - Constant deviation spectroscope. Spherical aberration in lenses - methods of minimizing spherical aberration - Condition for minimum spherical aberration - Chromatic aberration in lenses

UNIT II - INTERFERENCE:

Coherent Sources - Theory of Interference - Interference in thin films due to reflected and transmitted light - Colours of thin films - Air wedge - Diameter of a thin wire -Newton's rings in reflected light- Determination of wave length and

refractive index of lens and liquid - Michelson interferometer - construction and working - Determination of wave length.

UNIT III - DIFFRACTION:

Diffraction - Fresnel's explanation of rectilinear propagation of light - zone plate and its action - comparative study of Fresnel and Fraunhofer diffraction - Plane diffraction grating — Determination of wavelength using the grating - Dispersive power of the grating -Resolving power of a telescope, microscope, prism and grating. Comparison of Prism and grating spectra.

UNIT IV - POLARISATION AND ELECTROMAGNETIC THEORY:

Polarization of light waves - polarization by reflection - Brewster's law - double refraction - Nicol prism - Optical activity - specific rotatory power by Laurent's half shade polarimeter - Faraday effect and kerr effect. Electromagnetic waves - Maxwell's equations (no derivation) - propagation of electromagnetic waves through conducting medium and free space — Poynting vector.

UNIT V - FIBER OPTICS:

Structure of optical fibers - Classification of Optical fibers - Propagation of light through an optical fiber - Acceptance angle and Numerical aperture -Fiber characteristics -modes of propagation - step and graded index fibers – attenuation-absorption, scattering , bendinglossesandcoupling losses - Digital optical fiber communication system - its advantages.

BOOKS FOR STUDY:

1. Subramaniyam and Brijlal, A Textbook of Optics,(2005) S.Chand& Co., New Delhi,

2. Murugeshan, R , Optics, S.Chand& Co., New Delhi, (2005)

BOOKS FOR REFERENCE:

1. Subir Kumar Sarkar, Optic Fibres and Fibre Optic Communication Systems, S. Chand & Co., New Delhi, 2003.

B.Sc. Physics

IV SEMESTER

Instructional Hours :2

Credits   :2

Skill Based Elective - II: PROGRAMMING IN "C" LANGUAGE

Course Code   :   17UPYS2

Leaning objective :

- The teach children computer knowledge and provide them skills for the future establishment in effective education.

- To understand the basic terminology used in computer programming.

Learning Outcome

- Students will demonstrate the ability to extent current knowledge and skills to a computing environment.

- Students able to write, compile the debug programming in c language.

UNIT-I

History of development of computers-Computer system concepts-Characteristics -Capabilities and limitations-Generations of computers- Basic components of a computer system – memory –RAM, ROM, EPROM, PROM, Flash Memory.

UNIT - II

Input unit - output unit - Central Processing Unit -Control Unit- ALU-Various Storage Devices –Magnetic Tape, Magnetic Disks, Cartridge Tape, Data Drives, Hard Disk Drives, Floppy (Winchester Disk), Disks, Optical Disks, CD, VCD, CD-R, CD-RW, Zip Drive, DVD, SVCD-operating system.

UNIT-III

Programming languages -Algorithms - flow charts - Basic structure of C - Programs - Constants - Variables - Data type - declaration of variables - defining symbolic constants, operators and expression - Reading a character - Writing a character - formatted input and output statements.

UNIT - IV

Loop Introduction in C- while loop -do while Loop-for Loop - Decision Making in C Introduction- if Statement - if-else Statement -Nested if Statement-if else if Ladder-string functions -Stream, strcpy, strlen, strcmp - elementary idea.

UNIT-V

C Programs with algorithm and flow chart:

1. Program to find largest of three input numbers

2. Program to check if number is even or odd

3. C Program to display Fibonacci series

4. C Program to check Leap Year

5. C Program to check whether the given integer is positive or negative

6. Sum of series programsin C programming language

7. C Program for Swapping of Two Numbers Without Using Third Variable

Books for Study and Reference:

1. Programming in ANSI C - E. Balagurusamy

2. Programming with C - By ram Goltfried, Schaum Series

3. The Spirit of C - HerriMullish and Hubert Kooper

4. C for all - S. ThamaraiSelvi and R. Murugesan.

B.Sc. Physics

IV SEMESTER

Instructional Hours : 2

Credits   : 4

Core Course   : Major Practical - II

Course Code :   17UPYP2

Learning objectives

- The students to continue the development of their expertise in applying physical concepts to practical problems and in learning about experimental techniques and advanced equipment.

- The experiments complement some of the material covered in the theory courses, but the course can be taken independently.

Learning outcome

• Asses the possible hazards of conducting experiments and carry them out safely

• Acquire the appropriate data accurately and keep systematic record of your laboratory activities

•Interpret your findings using the correct physical scientific framework

•Communicate the findings succinctly using formal reports

•Use software packages to acquire, interpret and present experimental results

(Any Sixteen Only)

1. Young's modulus - uniform bending - pin and microscope

2. Young's modulus - uniform bending - scale and telescope method

3. Torsion pendulum - MI and rigidity modulus - symmetrical masses

4. Coefficient of Viscosity of a liquid - graduated burette - radius by mercury pellet method.

5. Melde's apparatus - frequency - transverse and longitudinal modes.

6. Specific heat capacity of a liquid by cooling - verification of Newton's law of cooling.

7. Specific heat capacity of a liquid - Joule's Calorimeter - Half time correction.

8. Determination of thickness of a wire and its insulation by Air Wedge.

9. Spectrometer - grating - minimum deviation.

10. Potentiometer - ammeter calibration.

11. Potentiometer - Specific resistance.

12. M and B_H - Deflection Magnetometer - TAN A and TAN B position.

13. Carey Foster's bridge - Specific resistance.

14. BG Comparison of capacities.

15. BG Comparison of EMF's of two cells.

16. Half and Full adder.

17. Half and Full subtracter.

18. Verification of DeMorgan's theorems.

19. OPAMP - adder and subtracter - IC 741

20. Four Bit- Binary counter- Adder and Subtracter.

(For candidates admitted from 2017 -2018onwards)

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM-636 007

B.Sc. Physics

Semester V

Instructional Hours : 5

Credits : 5

Core Course - V: ELECTRICITY AND ELECTROMAGNETISM
Course Code   :   17UPY05

Learning Objectives:

- To obtain the knowledge about the capacitors, basic idea of thermo electric principles and its applications.

- Effect of electromagnetism and construction of induction coil

- To gain the knowledge about AC and DC circuits.

Learning Outcomes:

- Practical applications of condensers in day to day life is experienced

- Gained the knowledge of application of thermoelectricity in the required electrical appliances.

- Practical application of production and distribution of electricity through transformers and related devices to the end users.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM-636 007

B.Sc. Physics

Semester V

Instructional Hours : 5

Credits : 5

Core Course - V: ELECTRICITY AND ELECTROMAGNETISM
Course Code   :   17UPY05

UNIT - I
Gauss law- Couloumb's theorem- Mechanical force near the surface of a charged conductor - Principle of a Capacitor - Energy stored in a Capacitor - Energy density - change in energy due to dielectric slab - force of attraction between plates of a charged Capacitor - Capacitance of a Spherical and Cylindrical Capacitors - Types of Capacitors - Electrometers - quadrant electrometer - measurement of potential, ionization current and dielectric constant (Solid)

UNIT - II
Carey Foster's Bridge - Theory - temperature Coefficient of resistance - potentiometer – Calibration of voltmeter and ammeter - Thermoelectricity - laws of thermo E.M.F, intermediate metals, intermediate temperature - S. G. Starling method for Peltier effect and Thomson effect - Thermo dynamics of thermo couple - determination of π and σ - Thermoelectric diagrams and its uses – determination of thermo emf using potentiometer

UNIT - III
Magnetic induction due to a straight Conductor carrying current – Magnetic induction at a point on the axis of a circular coil – determination of B_H using deflection magnetometer - Magnetic induction on the axis of a Solenoid - moving coil Ballistic galvanometer - Damping Correction - Determination of absolute capacity of a Condenser - Self - inductance by Anderson's Bridge method - Experimental Determination of mutual inductance - coefficient of coupling - principle, construction, action and working of Ruhmkorff's induction coil.

UNIT - IV
Transient current - Growth and decay of current in a circuit containing resistance and inductance - growth and decay of charge in a circuit containing resistance and capacitance - measurement of high resistance by leakage - Growth and decay of charge in a LCR circuit - condition for the discharge to the oscillatory - frequency of oscillation .

UNIT - V
Alternating current - peak, average and RMS value of current and voltage - j operator - ac circuit containing resistance and inductance - choke coil - ac circuit containing resistance and capacitance - series and parallel resonance circuits - Q factor – use of operator j in the study of AC circuit - power in an AC circuit containing LCR - Wattless current –Eddy currents- Transformer - construction, theory, energy loss and uses - skin effect – Teslacoil.

Books for Study:

1. Electricity and Magnetism - Brijlal and Subramaniam S. Chand & Co., (2005)

2. Electricity and Magnetism - R. Murugesan,   S. Chand & Co., (2005)

Books for Reference:

1. Electricity and Magnetism - D. N. Vasudeva,   S. Chand & Co., (2005)

2. Electricity and Magnetism- K. K. Tewari,   S. Chand & Co., (2005)

Core Course - VI: BASIC ELECTRONICS AND   Instructional Hours : 5
                 DIGITAL ELECTRONICS
Course Code   : 17UPY06   Credits   : 5

Aims & Objectives

Scope of the syllabus is structured based on specific aims and objectives as follows:

- To study the semiconducting devices like diodes, FET, UJT, oscillators and multivibrators.

- To equip the knowledge of combinational and sequential logic circuits.

- To make aware of the A/D and D/A conversion using R/2R ladder and successive approximation methods.

Outcome

- The extensive study of devices helps the students to construct various electronic circuits for the desired results on their own.

- The knowledge of basic and digital electronics enhances students for further study of microprocessors and computers

Core Course - VI: BASIC ELECTRONICS AND   **Instructional Hours : 5**
DIGITAL ELECTRONICS
Course Code : 17UPY06   **Credits : 5**

Learning Objectives:

- To study the characteristics of Diodes and Transistors.
- To study the working of function of Op-Amp.
- To fabricate the basic ideas of Integrated Circuits.
- To provide basic skills to use the Instruments.

Outcome

- The Students have learned to handle the various Physical instruments in Laboratory.

UNIT - I

    Band theory of solids - Classification of solids in terms of energy gap – Intrinsic and extrinsic semi conductors–PN Junction diode - Zener Diode and its breakdown mechanism - circuit analysis of Zener diode - voltage regulator - LED - Half wave and full wave rectifier using two diodes and their efficiency calculation - Ripple factor - Hybrid parameters - determination - equivalent circuit - linear circuit – determination of h parameters of an CE transistor.

UNIT - II

    Transistor as an amplifier (CE Mode) - DC and AC load line analysis - Transistor biasing - stabilization - Voltage divider bias method - Construction of JFET - its characteristics and parameters - MOSFET - Depletion MOSFET - Enhancement MOSFET - UJT, SCR - Construction, working, V-I characteristics and their application.

UNIT - III

    Single Stage transistor amplifier - gain calculation - current amplification analysis (C-E only) - Feed back amplifier - Voltage gain of feed back amplifier - advantages of negative feed back- emitter follower - positive feed back amplifier - oscillator – Hartley and Colpitt's oscillator - multivibrator - astable, monostable and bistablemultivibrator using transistor.

UNIT - IV

    De- Morgan's Theorems - basic logic gates - universal gates - Introduction to combinational logic - Sum of Product (SOP) - Product of Sum (POS) forms of expression - min terms and max terms - reducing Boolean expression solving Boolean's laws - karnaugh map - karnugh map simplification (SOP only) - Half adder - full adder - half subtractor - full subtractor - decoder - encoder - multiplexer - demultiplexer.

UNIT - V

    RS flip - flop using NAND gates and NOR gates - clocked R-S flip flops - D flip flop - T flip flop - master slave flip flop, J-K flip flop - 3 bit register using flip flop Series and Parallel counter – BCD counter - A/D conversion – R-2R ladder method - D/A conversion – successive bit approximation.

Books for Study:

1. Basic Electronics (Solid state), B.L. Theraja, S. Chand & Co., (2000)
2. Principles of Electronics, Metha, V.K. S. Chand & Co., (2001)
3. Digital Principles and Applications, Malvino and Leach, TMH.
4. Digital design-Morris mano, PHI.

Books for Reference:
1. Digital Electronics, AvinashKapoor&Maheswari, Principles and Practice.
2. Digital Electronics, A.P. Godse, Technical Publisher, Pune.

GOVERNMENT ARTS COLLEGE [AUTONOMOUS], SALEM-7
B.Sc. Physics
V SEMESTER

Core Course - VII: ATOMIC PHYSICS   **Instructional Hours:5**
Course Code   : 17UPY07   **Credits   :5**

Aims & Objectives

Scope of the syllabus is structured based on specific aims and objectives as follows:

- To understand the students about the Photoelectric Effect, Compton Effect and methods of determination of isotopes.

- To enlighten the students' knowledge of vector atom model and various coupling schemes.

- To make aware of the students about the difference between Zeeman and stark effect.

Outcome

- The illustrative topics and its methodical order in the syllabus can help the students to perceive knowledge of mass spectrograph.

- The acquisition of subject knowledge through this syllabus can empower the undergraduate students to face up the D1 and D2 lines of Sodium.

Core Course - VII: ATOMIC PHYSICS   **Instructional Hours :5**
Course Code   :   17UPY07   **Credits   :5**

UNIT - I

Photoelectric effect - Lenard's method to determine e/m for photoelectrons - Richardson and Compton experiment - relation between photoelectric current and retarding potential - relation between velocity of photoelectrons and frequency of light - failure of electromagnetic theory - Einstein's light quantum hypothesis and photoelectric equation - experimental verification of photoelectric equation - Millikan's experiment-Compton effect – Change in wavelength.

UNIT - II

Positive rays -discovery and properties, Positive ray analysis - Thomson's parabola method - theory - determination of e/m and mass of positive ions - Astons mass spectrograph – Dempsters mass Spectrograph - determination of masses of isotopes - uses of mass spectrographs .

UNIT - III

Rutherford experiments – Scattering of α particle, Theory of alpha scattering –Relation between impact parameter and scattering Rutherford scattering formula - experimental verification Bohr's correspondence principle - evidences in favour of Bohr's theory, Critical potential, atomic excitation - Determination of critical potential, Frank and Hertz's method - Davis and Goucher's method -

UNIT - IV

Atom models - vector atom model - quantum numbers associated with vector atom model - coupling schemes - J.J. coupling - LS. coupling - application of spatial quantisation - Pauli's exclusion principle- Magnetic dipole moment due to orbital motion of the electron - magnetic dipole due to spin - Stern - Gerlach experiment.

UNIT - V

Optical spectra - Spectral terms and notations - the selection rule - intensity rule - Lande's g factor - electron configuration - fine structure of Sodium D lines - fine structure of Hα line - Zeeman effect - Larmor's theorem - Quantum mechanical explanation of normal Zeeman effect - anomalous Zeeman effect of D_1 and D_2 lines of sodium – Elementary idea of Paschen – Back effect and Stark effect.

Books for study:
 1   Modern Physics - by R. Murugesan, S. Chand & Co. (2004)
 2   Atomic Physics - J.B. Rajam, S. Chand & Co. (2004)
 3   Atomic and Nuclear Physics - N. Subramanyam and Brijlal, S. Chand & Co.(2004)
Books for Reference:
 1   Atomic specra by White (2003), McGraw Hill Intl. Book Company
 2   Atomic and Nuclear Physics ,H. Semat and J.R. Albright, Chapman and Hall (2003)
 3   Atomic and Nuclear Physics, T.A. Littlefields and Thorley, ELBS (2003)
 4   Atomic and Nuclear Physics , S.N. Ghoshal, S. Chand & Co (2004).

B.Sc. Physics
VI SEMESTER

Core Course : Major Practical - III   Instructional Hours :3
Course Code : 17UPYP3

Learning objectives

- The students to continue the development of their expertise in applying physical concepts to practical problems and in learning about experimental techniques and advanced equipment.

- The experiments complement some of the material covered in the theory courses, but the course can be taken independently.

Learning outcome

• Asses the possible hazards of conducting experiments and carry them out safely

• Acquire the appropriate data accurately and keep systematic record of your laboratory activities

•Interpret your findings using the correct physical scientific framework

•Communicate the findings succinctly using formal reports

•Use software packages to acquire, interpret and present experimental results

Credits   :4
(Any Sixteen Only)

1. Cantilever - Young's modulus - mirror and Telescope (Depression method).

2. Static torsion - Rigidity modulus.

3. Coefficient of Viscosity - ungraduated burette - radius by mercury   pellet.

4. Kundt's tube - Young's modulus - Velocity of Sound.

5. Lee's disc - thermal Conductivity of a bad conductor and emissivity.

6. Newton's rings - refractive index of a lens.

7. Spectrometer - i - i' curve.

8. Spectrometer - Small angled Prism.

9. Potentiometer - Calibration of high range Voltmeter.

10. Deflection magnetometer - m and B_H - Tan C position.

11. Principle of Multimeter.

12. B.G. - Charge Sensitivity.

13. Verification of Kirchoff's laws

14. Determination of thermo e.m.f - direct method - MG

15. Bridge rectifier with four diodes.

16. FET - Characteristics

17. UJT - Characteristics

18. SCR - Characteristics

19. Hartley Oscillator

20. Colpitt's Oscillator

21. Microprocessor experiment – Addition in various addressing modes

22. Microprocessor experiment – Multiplication, Square of a 8 bit number

GOVERNMENT ARTS COLLEGE [AUTONOMOUS], SALEM-7
B.Sc. Physics
VI SEMESTER

Core Course   : Major Practical - IV   **Instructional Hours :3**
Course Code   : 17UPYP4   **Credits   :4**

Learning objectives

- The students to continue the development of their expertise in applying physical concepts to practical problems and in learning about experimental techniques and advanced equipment.

- The experiments complement some of the material covered in the theory courses, but the course can be taken independently.

Learning outcome

• Asses the possible hazards of conducting experiments and carry them out safely

• Acquire the appropriate data accurately and keep systematic record of your laboratory activities

•Interpret your findings using the correct physical scientific framework

•Communicate the findings succinctly using formal reports

•Use software packages to acquire, interpret and present experimental results

(Any Sixteen Only)

1. Koenig's method - non - uniform bending.

2. Koenig's method - uniform bending.

3. Cantilever - dynamic method.

4. Bifilar pendulum - Parallel threads.

5. Determination of Energy Band gap of a semiconductor.

6. Newton's rings - Refractive index of a liquid.

7. Spectrometer - dispersive power of a grating.

8. Spectrometer - Cauchy's constant.

9. Potentiometer - emf of a thermocouple.

10. Field along the axis of a coil - vibration magnetometer.

11. Carey Foster's bridge - temperature Coefficient of resistance.

12. BG comparison of capacities - De Sauty's bridge.

13. BG comparison of mutual inductances.

14. Making of multiplug switch boards

15. Astablemultivibrator using 555 timer.

16. Monostablemultivibrator using 555 timer.

17. Bistablemultivibrator using 555 timer.

18. Flip flops using gates.

19. RC coupled amplifier - single stage.

20. Operational amplifier - integrator and differentiator.

21. Microprocessor experiment – Subtraction in various addressing modes

22. Microprocessor experiment – Division, Square root of a 8 bit number

Major Based Elective I : NUMERICAL METHODS	**Instructional Hours :5**
Course Code : 17UPYM1	**Credits :5**

Learning Objectives:

• To impart mathematical knowledge for the description of physical phenomena.
• To provide basic skills to learn and appreciate physics through Numerical Methods.

Outcome

At the end of the course, the students would be acquainted with the basic concepts in numerical methods

Major Based Elective I : NUMERICAL METHODS　　　　Instructional Hours :2
Course Code　:　17UPYM1　　　　　　　　　　　　　　Credits　　:2

UNIT - I: MATRICES:

Solution of linear equation – Cramer's rule – characteristics matrix and characteristics equation of a matrix – eigen values and eigen vectors – Diagonalisation matrix –Diagonalisationof 3 x 3 symmetric matrices.

UNIT – II: BETA AND GAMMA FUNCTIONS:

Fundamental property of gamma functions – the value of gamma and graph of gamma function – transformation of gamma function – different forms of beta function – relation between beta and gamma function.

UNIT – III CURVE FITTING:

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

UNIT – IV: ITERATIVE METHODS:

Solving non – linear equation – bisection method – Successive approximations – Newton Rapson method – modified Euler's method – Runge – Kutta method (Second and third orders only)

UNIT – V: NUMERICAL INTEGRATION:

General formula – Trapezoidal rule – Simpson's ⅓ and ⅜ rules – Gaussian quadrature formula – Two point and Three point formula.

Books for study:
1　　Introductory methods of numerical analysis – S.S. Sastry,
　　　Prentice Hall of India, New Delhi 2000 Edition.
2　　Numerical methods – A. Singaravelu, Meenakshi Agency, Chennai (2001)
3　　Numerical method in Science and Engineering – M.K. Venkataraman, PHI – New Delhi, 1997

Books for References
1　　Mechanics and Mathematical methods, R. Murugesan, S. Chand & Co, New Delhi – 1999.

2　　Numerical Methods, P.Kandasamy, K. Thilagavathy, K. Gunavathi, S. Chand & Co, New Delhi.

Skill Based Elective -III : ELECTRONIC DEVICES   **Instructional Hours :2**
Course Code   : 17UPYS3   **Credits   :2**

Learning Objectives:

- To study the characteristics of Diodes and Transistors.
- To study the working of function of Op-Amp.
- To fabricate the basic ideas of Integrated Circuits.
- To provide basic skills to use the   Instruments.

Outcome

- The Students have learned to handle the various Physical instruments in Laboratory.

Skill Based Elective -III : ELECTRONIC DEVICES　　　　　**Instructional Hours :2**
Course Code : 17UPYS3　　　　　　　　　　　　　　　**Credits :2**

UNIT - I DIODES & TRANSISTORS

Junction diode – V-I characteristics – Bridge rectifier – Transistor – Structure – Working of transistor – Transistor characteristics – CB,CC,CE configuration – comparison among these.

UNIT - II MEASURING INSTRUMENTS

Conversion of galvanometer to an ammeter - galvanometer to an voltmeter - galvanometer to an ohmmeter - galvanometer to an analog multimeter – CRO and its applications.

UNIT - III OP-AMP BASICS

The basics of OP AMP and its characteristics - CMRR - virtual ground - inverting and non - inverting amplifier - OP AMP as adder, subtractor, differentiator and integrator.

UNIT - IV FABRICATION OF INTEGRATED CIRCUITS

Basicsofmonolithic IC - epitaxial growth, masking and etching - fabrication of monolithic and hybrid integrated circuits - fabrication of IC components - resistors, capacitors, diodes and transistors - Resistance colour coding.

UNIT - V ELECTRONIC INSTRUMENTS

Transistor voltmeter (FET) - digital frequency meter - recorders –Classification of recorders – working and application - XY recorders - strip chart recorders.

Books for Study:

1. Basic Electronics – Solid State- B.L. Theraja, S. Chand & Co., New Delhi
2. Principles of Electronics – V.K. Metha
3. Integrated Electronics - Millman and Halkias - McGraw Hill Co.
4. Electronic devices and circuits - Allen Mottershed (PHI)
5. Electronic and Radio Engineering - E.E. Terman
6. Introduction to Electronics - A. Ambrose & T. Vincent Devaraj

Books for Reference:

1. Handbook of Electronics - Gupta and Kumar
2. Linear OP - Amp applications - Ram &Gaekwad
3. A course in Electrical & Electronic measurement and instrumentation - A.W. Sawhney

GOVERNMENT ARTS COLLEGE [AUTONOMOUS], SALEM-7

B.Sc. Physics
V SEMESTER

Skill Based Elecive -IV: FUNDAMENTALS OF COMPUTERS **Instructional Hours :2**

Course Code   : 17UPYS4 **Credits :2**

<u>Learning Objectives:</u>

- Provide a comprehensive and clear description of computer networks
- Articulate an expectations for computer learning
- Providing awareness to the students about social networks

<u>Outcome</u>

- The Students know about fundamentals of computers and awareness on internet.

B.Sc. Physics
V SEMESTER

Skill Based Elecive -IV: FUNDAMENALS OF COMPUTERS   **Instructional Hours :2**

Course Code   : 17UPYS4   **Credits**   **:2**

UNIT – I

     Introduction to computer: Introduction – Types of computer – Characteristics of computers– What computers can do – What computers Can't do – classification of digital Number System – Binary, octal, decimal, Hexa decimal.

UNIT – II

     Input device –Types of Input devices- Output device- Types of Output devices – CPU-Memory unit- Auxillary storage devices.

Unit – III

     Operating system – Types of Operating Systems - Computer networks – Overview of a network – Types of networks – Network topologies – Network protocols – Network Archives.

UNIT – IV

     Internet – Introduction – What's special about internet – internet access – internet basics – The World Wide Web – Web browsers – Searching the web – Internet chat- Social Network (Twitter, Facebook, Instagram, Viber and WhatsApp).

UNIT –V

     Electronic mail – use of E-mail – How E-mail works – E-mail names addresses – Mailing basics – Email ethics – Spanning – E-mail advantages and disadvantages – tips for effectives Email use – smileys useful – Email services.

Books for Study:

1. Fundamentals of computer science and communications engineering –Alexis Leon and Matthews Leon

Books for Reference:

1. Internet (Tamil) – K.Sunderarajan M.Sc., A.M.E.T.E kannadasanPathipagam,
   Chennai-600017
2. Introduction to computer – Schaum'soutline series.

Core Course - VIII: NUCLEAR PHYSICS　　　　　　　　**Instructional Hours :5**
Course Code   :   17UPY08　　　　　　　　　　　　　　　**Credits　　　:5**

Learning Objectives:

- To study the structure and models of nucleus and also to study the process of radioactivity and its applications.
- To study the working of detectors, accelerators and cosmic rays.
- To study the aspects related to elementary particle and space physics.

Outcome

At the end of the course, the students understand the Basic Principles of Nuclear Physics.

Core Course - VIII: NUCLEAR PHYSICS   Instructional Hours :5
Course Code   :   17UPY08   Credits   :5

UNIT - I NUCLEAR STRUCTURE
     Proton - electron theory - proton - neutron theory - Nuclear size - measurement of nuclear radius - neutron interaction method - isotope structure method - mirror nuclei method - Nuclear magnetic moment – determination of nuclear magnetic moment Rabis's method - Nuclear forces Meson theory of nuclear forces - Nuclear models - liquid drop model - Weizacker's semi - empirical formula - nuclear shell model.

UNIT - II   RADIOACTIVITY
     Laws of successive disintegration - transient - and secular equilibria - range of alpha particles - experimental measurement - Geiger - Nuttal Law - alpha ray spectra - Gamow's theory of alpha decay and its experimental verification - Beta ray spectra - origin of line and continuous spectrum - Fermi's theory of beta decay - K electron capture - Nuclear Isomerism.

UNIT - III ARTIFICIAL TRANSMUTATION :
     Rutherford's experiment - Bohr's theory of Nuclear disintegration - Q value equation for a nuclear reaction - threshold energy - types of nuclear reaction - energy balance and the Q value - threshold energy of an endoergic reaction - the cross section for nuclear reaction.
     Neutron : Mass, Charge, Decay, Spin and magnetic moment, Neutron diffraction, absorption of neutron by matter - neutron sources - detectors - neutron collimator.

UNIT - IV   NUCLEAR DETECTORS :
     Principle and working –solid state detector - proportional Counter - GM Counter - Wilson's cloud chamber - Scintillation counter – Walton tension multiplier – Van de Graff generator. Accelerators : Synchrocyclotron - Synchrotron - Electron synchrotron - proton synchrotron - Betatron.

UNIT - V NUCLEAR FISSION,FUSION AND ELEMENTARY PARTICLES:
     Types of nuclear fission - Bohr Wheeler theory - chain reaction - critical size and critical mass - Nuclear fusion - source of stellar energy - carbon - Nitrogen cycle - Proton - proton cycle - Thermo Nuclear reaction - Controlled thermo nuclear reaction –Fast Breeder Reactors –Elementary Particles - types of interaction - classification of elementary particles - particle quantum numbers - baryon number - lepton number.

Books for Study:
1   Modern Physics by R. Murugesan, S.Chand& Co., (2005)
2   Atomic Physics by J.B. Rajam, S.Chand& Co., (2005)
3   Nuclear Physics by D.C.Tayal, Himalaya Publishing House.

Books for Reference:
1   A Source book on Atomic energy by Samuel Glass Stone (2002)
2   Atomic and Nuclear Physics by AlbrigntSemat (2003)
3   Atomic and Nuclear Physics by Little field and Thorley.   ELBS (2002)
4   Basic Nuclear Physics and Cosmic rays, B.N. Srivatsava,   PragtiPrakasham.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM – 7
B. Sc., PHYSICS
VI SEMESTER

Core Course – IX: QUANTUM MECHANICS AND RELATIVITY   **Instructional Hours: 5**
Course Code: 17UPY09   **Credits :5**

Aims & Objectives

Scope of the syllabus is structured based on specific aims and objectives as follows:

- To edify the students about the necessity of evolution of quantum mechanics and its way of approach in dealing the issues wherein the conventional methods incapable.

- To enlighten the students the significance and applications of Schroedinger's wave equations in solving intricate problems such as hydrogen atom, rigid rotator, etc.

- To make aware of the students the fundamentals of relativistic mechanics and its correlations with Quantum Mechanical theory.

Outcome

- The illustrative topics and its methodical order in the syllabus can help the students to perceive the Quantum Mechanical theory in comprehensive manner.

- Learning of the subject through problematic manner can equip the students to solve any complicated subject issues by cognitive means.

- The acquisition of subject knowledge through this syllabus can empower the undergraduate students to face up the advanced Quantum Mechanical topics particularly in higher studies.

B. Sc., PHYSICS
VI SEMESTER
Core Course – IX: QUANTUM MECHANICS AND RELATIVITY   **Instructional Hours: 5**
Course Code: 17UPY09   **Credits :5**

Unit – I – Dual Nature of Matter

Inadequacy of classical mechanics - Matter waves - Phase and group velocity - Wave packet - Expressions for de-Broglie wavelength - Davisson and Germer's experiment - G.P. Thomson experiment – Heisenberg's uncertainty principle – Determination of position with γ – ray microscope – Diffraction of a beam of electrons by a slit-Non existence of electrons in the nucleus.

Unit – II – Wave Mechanics

Schrodinger's wave equation – Derivation of Time dependent and Time independent forms – Physical significance of wave function – Normalised and Orthogonal wave functions - Basic postulates of Quantum mechanics – Operator formalism – Eigen values and Eigen functions – Linear operators – Adjoint operators – Expectation values.

Unit – III – Applications of Schroedinger's Equations

Application of Shcroedinger equation – Free particle solution of Schroedinger's equation – Particle in a box (One dimensional approach) – Determination of normalised wave function – Barrier penetration problem – Square well in three dimensions – Linear harmonic oscillator – Harmonic oscillator wave functions.

Unit – IV – Three Dimensional Problems

Three dimensional Schrödinger's wave equation –Hydrogen atom – Wave equation for the Motion of an electron – Separation of variables– Radial wave equation and it's solutions – Polar wave equation and its solution – Azimuthal wave equation and its solution – Rigid rotator – Separation of variables – Rotational energy levels and eigen functions.

Unit – V – Relativity

Frame of reference – Galilean transformation – Michelson – Morley experiment – Postulates of special theory of relativity – Lorentz transformation – Length contraction – Time dilation – Relativity of simultaneity – Addition of velocities – Variation of mass with velocity – Mass – Energy relation – Minkowsky's four dimensional space – Time continuum – Four vectors – Elementary ideas of general theory of relativity.

Books for Study:

1. Modern Physics, R. Murugesan,

2. Advanced Quantum Mechanics, SatyaPrakash, KedarNath Ram Nath Publications

3. A text book of Quantum Mechanics, Mathews &Venkatesan, Tata McGraw Hill, New Delhi

4. Relativity and Quantum Mechanics, P.K. Palanisamy, Sitech Pub., Kumbakonam.

Books for Reference

1. Quantum Mechanics, Leonard Schiff, McGraw Hill Book Company, Inc., New York.

2. Quantum Mechanics, Ghatak&Loganatha, Mcmillan Publications,

3. Perspective of Modern Physics, Beiser, McGraw Hill Co. New York.

Major Based Elective - II : SOLID STATE PHYSICS   **Instructional Hours :5**
Course Code   : 17UPYM2   **Credits   :5**

Learning Objectives:

1. To study the crystal packing and imperfections
2. To study Crystallography and crystal imperfections.
3. To study conductor, super conductor and semiconductor
4. To Study modern engineering materials

Outcome

1. Students are gaining knowledge of crystal and their properties, and also knowing their resistivity, conductivity and their applications

GOVERNMENT ARTS COLLEGE [AUTONOMOUS], SALEM-7
B.Sc. Physics
VI SEMESTER

Major Based Elective - II : SOLID STATE PHYSICS   **Instructional Hours :5**
Course Code   : 17UPYM2   **Credits   :5**

UNIT - I :   CRYSTAL STRUCTURE:
     Crystal lattice - primitive and unit cell - seven classes of crystal - Bravasis lattice - Miller - indices - structure of crystals - simple cubic, hexagonal close packed structure, face centered cubic structure - Body Centered cubic structure, simple cubic structure, Sodium chloride structure, Zinc blende structure, Diamond structure.

UNIT- II : CRYSTALLOGRAPHY AND CRYSTAL IMPERFECTIONS:
     X ray Spectrum - Moseley's law diffraction of X-rays by crystals - Bragg's law in one dimension - Experimental method in X-ray diffraction - Laue method, Rotating crystal method - powder photograph method - Von Laue's equation, point defects - line defects - surface - volume defects - Effects of crystal imperfections.

UNIT - III: MAGNETIC PROPERTIES
     Different types of magnetic materials - classical theory of diamagnetism (Langevin's theory) - Langevin's theory of paramagnetism - Weiss theory of paramagnetism, Ferro magnetism - Anti ferromagnetism - Ferrites - General properties of super Conductivity - Types of Super conductivity and applications.

UNIT - IV: DIELECTRIC PROPERTIES
     Fundamental definition in dielectrics - Different types of electric polarization - Frequency and temperature effects on polarization - Dielectric loss - local field (quantitative only) - Clausius - Mosotti relation - determination of dielectric constant - dielectric breakdown - properties of different types of insulating materials.

UNIT - V: MODERN ENGINEERING MATERIALS
     Polymers - Ceramics - Super strong materials - cermets high temperature materials - Thermo electric materials - Electrets - Nuclear engineering materials - Plastics metallic glasses - Optical materials - Fiber optic Materials & uses.

Books for Study:
1.   Introduction to Solid State Physics - C. Kittel, John Wiley (2004)
2.   Material Science - M. Arumugam, Anuradha Agencies, (2004).
3.   Solid State Physics – S.L. Gupta and V. Kumar, K. Nath& Co.,

Books for Reference:

1.   Materials Science and Engineering - Raghavan (2004)
2.   Introduction to Solids - Azaroff (2004)
3.   SolidState Physics - A.J. Deckker (2004)

GOVERNMENT ARTS COLLEGE [AUTONOMOUS], SALEM-7
B.Sc. Physics
VI SEMESTER

Major Based Elective - III : ELECRONICS AND   **Instructional Hours :5**
                              COMMUNICATION
Course Code   :   17UPYM3   **Credits   :5**

Objectives

1. To acquire knowledge about modulation and demodulation techniques

2. To understand the concepts and techniques involved in communication by TV

3. To learn the working principles of RADAR and basic ideas about Optoelectronic devices like photoconductive cell, solar cell, phototransistor LCD, LED.

4. To study the digital communication and characterization data transmission circuits

Outcome

1. Practical applications of Electronic equipment's in day to day life is experienced

2. Gained the knowledge of communication and broadcasting system.

Major Based Elective - III :ELECRONICS AND COMMUNICATION   Instructional Hours :5

Course Code   :   17UPYM3   **Credits   :5**

UNIT - I
Modulation - definition - types of modulation AM, FM, PM - expression for amplitude modulated voltage - Wave form of amplitude modulated wave - collector modulation circuit - single side band generation - balanced modulator - AM transmitter - block diagram and explanation - frequency modulation - expression for frequency modulated voltage - side bands in FM, AM production by transistor modulator - Comparison of AM, FM, PM.

UNIT - II
Demodulation - definition - Diode detection of AM signals - FM detection - Foster Seely discriminator.

Radio receivers - straight receivers - TRF receivers - super heterodyne receivers - Block diagram - explanation of each stage - FM receivers - Block diagram.

UNIT - III
TV - plumbicon - vidicon - scanning and interlaced scanning - block diagram of TV transmitter and receiver - Colour TV - generation R, G, B signals - Simplified block diagram of colour TV transmitter and receiver - TV transmitting antennas - dipole panel - TV receiving antenna - Yagi antenna - log antenna - log periodic antenna.

UNIT - IV
RADAR - principle of radar - Radar equation - radar - transmitting systems - radar antennas - duplexer - radar receivers uses of radar - Opto electronic devices - photoconductive cell - solar cell - phototransistor - LED - LCD construction and working.

UNIT - V
Digital communications - digital technology - fundamentals of data communication systems - characteristics of data transmission circuits - digital codes - error detection and correction - data sets and inter connection - requirements - modern classification - modern interfacing – Elementary idea of Satellite Communication .

Books for Study:
1. Hand book of Electronics - Gupta & Kumar, PragatiPrakhasan (2005)
2. Electronics Communication Systems - Kennedy and Davis, TMH
3. Basic Electronics – Mithal
4. Principle of Electronics – Metha

Books for References
1. Communication Electronics, Frenzel
2. Electronic Communication System, Wayne Tomasi.

Skill Based Elective - V: ELECTRICAL APPLIANCES   Instructional Hours :2
Course Code   :   17UPYS5   Credits   :2

Aims & Objectives

Scope of the syllabus is structured based on specific aims and objectives as follows:

- To understand the students about the necessity of heating and welding equipment's and its way of handling the equipment in dealing the issues wherein the conventional methods incapable.

- To enlighten the students the significance and applications of Transformers and mode of connection of three Phase transformers.

- To make aware of the students about the principles of domestic applications.

Outcome

- The illustrative topics and its methodical order in the syllabus can help the students to perceive the Electrical Appliances in the comprehensive manner.

- Learning of the subject through systematic circuit will provide amble knowledge to handle the electrical equipment's systematically.

- The acquisition of subject knowledge through this syllabus can empower the undergraduate students to face up the defects in electrical circuit and managing how to rectify the electrical problems.

Skill Based Elective - V: ELECTRICAL APPLIANCES   Instructional Hours :2
Course Code   : 17UPYS5   Credits   :2

UNIT - I Heating

Electric heating - Modes of transfer of heat – Applications of heat transfer.- Methods of electric heating - resistance heating - Induction heating - High frequency eddy current heating - Dielectric heating

UNIT - II Welding

Resistance welding - Electric arc welding - DC and AC welding equipment - Energy storage welding - Industrial heating and welding.

UNIT - III Principles of transformers

Principle of operation - Constructional details - Core type, Shell type - classification of transformers - EMF equation - Transformer ratios –Losses in a transformer, Efficiency of a transformer, Condition for maximum efficiency, Variation of efficiency with power factor – All day efficiency - Auto transformer - Principle – Applications.

UNIT - IV Applications of transformers

Three phase Transformer - Connections - Star - Star, Star - delta, Delta- Star, Delta-Delta - Parallel operation of transformers (Single phase and Three phase) Load sharing of transformer (definition only) - Cooling of transformers - Protective devices and accessories.

UNIT - V Domestic appliances

Construction and working principle of home appliances- fan - Wet grinder - Mixie - Water heater - Electric iron - Refrigerator - Microwave oven.

Books for Study:
1.   A text book in Electric power, P.L. Soni, P.V. Gupta & V.S. Bhatnagar

2.   Utilisation of Electrical Energy, E.O. Taylor, Orient Longman
3.   Art & Science of Utilisation of Electrical Energy,
        H. Partas, M/s. DhanpatRaji& Sons, New Delhi.
4.   A Course in Electrical Power, J.B. Gupta, M/s. B.D. Jaataris& Sons.

Books for Reference:
1. A text book in Electrical Technology, B.L. Teraja, S. Chand & Co., New Delhi

2. A text book in Electrical Technology, A.K. Teraja, S. Chand & Co., New Delhi

3. Alternating current machines, Philip Kermp
4. Performance and design of A.C. Machines, M.G. Say, ELBS Edn.

5. Theory of alternating current Machinery, Alexander Langsdort.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), SALEM -636007

B.Sc Physics

VI SEMESTER

Skill Based Elective VI: Microprocessor 8085 and applications   **Instructional hours: 2**

Course Code: 17UPYS6   **Credits: 2**

Objectives

1. To distinguish between microcomputer and microprocessor
2. To learn the
    a. basics of microprocessor
    b. Pin configuration and architecture of 8085
3. To explore the instruction set of 8085
4. To expertise assembly language programming in 8085

Outcome

The students can

1. Draw the pin configuration and architecture of 8085 microprocessor and explain the same
2. Understand tasks of instructions of 8085
3. write the assembly language programs on their own

B.Sc Physics

VI SEMESTER

Skill Based Elective VI: Microprocessor 8085 and applications Instructional hours: 2

Course Code: 17UPYS6   **Credits: 2**

UNIT- I

Terms related to microprocessor (microprocessor, microcomputer, Bit, Byte, MSB, LSB, Nibble, Word, Instruction, Bus, Mnemonic, Program, Machine language, Assembly language) - Functional block diagram of microcomputer - Development of microprocessor – Pin configuration of microprocessor of 8085

UNIT-II

Architecture of microprocessor 8085 – Word length –registers – ALU – Accumulator – stack pointer – program counter – Flags - internal data bus –Instruction format – Mnemonics – Classification of instructions of 8085 based on their length with examples

UNIT-III

Addressing modes of 8085- Instruction set of 8085 – Classification of instruction set based on the function with examples – Data transfer operations – Arithmetic operations – Logical operations – Branching operations – Machine control operations

UNIT-IV

Assembly language programs: Transferring a block of data – 8 bit addition - 8 bit subtraction - 8 bit multiplication – 8 bit division –Square and Square root of a number

UNIT-V

Assembly language programs: Arranging numbers in ascending and descending order (Bubble sort method) – Finding greatest and smallest number in an array – Sum of N numbers – Generating Fibonacci series

Books for Study:

1. Ramesh S. Gaonkar – Microprocessor Architecture Programming and applications
2. Gilmore, Microprocessor principles and Application, TMH

Books for Reference:

1. P.Mathur, Introduction to microprocessor, TMH