RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)

(Re-accredited with A Grade by NAAC)

THANJAVUR – 613 005.

PG and Research Department of Physics

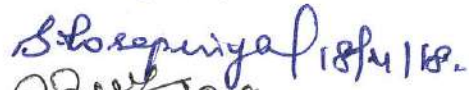## Board of Studies: 2018-2019

(Under CBCS Pattern)
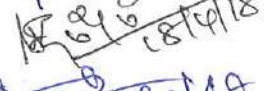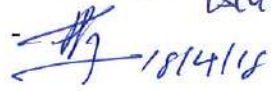
[For the Candidates admitted from 2018 -2019 onwards]

PG AND RESEARCH DEPARTMENT OF PHYSICS
RAJAH SERFOJI GOVERNMENT COLLEGE (Autonomous)
THANJAVUR 613005

BOARD OF STUDIES MEETING
18.04.2018
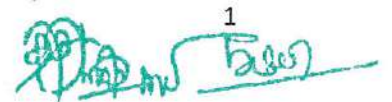
The meeting of Board of Studies (BoS) in physics was held on 10.30 am on 18.04.2018 (Wednesday) at the department of physics under the chairmanship of Dr.T.Arivudainambi, Head, PG and Department of physics. The following members are present in the meeting

Internal Members

1. Prof.S.Dhandapani
2. Dr. A.Santhanam
3. Dr.G.Rani
4. Dr.S.Sakthivel
5. Dr.S.Rosepriya
6. Prof.S.Senthilkumari
7. Prof.B.Shanmugapriya
8. Dr. S.Nilavazhagan
9. Dr.S.Veera Rethina Murugan
10. Dr.T.Ganesh
11. Prof.N.Chidambaram
12. Prof.D.Anbuselvan
13. Dr.P.Jagdish
14. Dr. P.Paramansivam
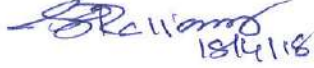
HEAD,
DEPARTMENT OF PHYSICS,
RAJAH SERFOJI GOVT. COLLEGE.
THANJAVUR-613 005.

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RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

1

External Members

1. Dr.B.Ravikumar   -
2. Dr. S.Rajasekar   -
3. Dr.P.Philominathan   -
4. Dr.P.Thilagan   -
5. Dr. V.Senthamizh selvi -

The Syllabi for B.Sc. Physics (Major and Allied), M.Sc. Physics, and M.Phil. Physics under CBCS system was discussed and correction/changes were made and finalized for the academic year 2018-2019 onwards. The finalized syllabus is approved in the meeting which is appended herewith.

HEAD,
DEPARTMENT OF PHYSICS,
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Dr.T.Arivudainambi

(Chairman BoS - Physics)

2

RAJAH SERFOJI GOVT COLLEGE (AUTOMONOUS), THANJAVUR-5
COURSE STRUCTURE FOR Science Course
SUBJECT: PHYSICS
(Applicable to the Candidates admitted from the academic year 2018-2019 onwards)

PART	CODE	COURSE	TITLE	HRS	MARKS		TOTAL	CREDIT
					IE	WE		
			I SEMESTER					
I	S1T1	LT	PART I Tamil - I	6	25	75	100	3
II	S1E1	LE	PART - II English - I	6	25	75	100	3
III	S1PH1	CC1	Properties of Matter and sound	6	25	75	100	5
III	S1PHP1	CC2	Major Practical - I	3	40	60	100	5
III	S1AM1	Allied 1	Allied Mathematics - I	4	25	75	100	4
III	S2AM3	Allied 3	Allied Mathematics - III	3	-	-	-	
IV	S1VE	VE	Value Education	2	50	50	100	2
			TOTAL	30			600	22
I	S2T2	LT	PART I Tamil - II	6	25	75	100	3
II	S2E2	LE	PART - II English - II	6	25	75	100	3
III	S2PH2	CC3	Mechanics	6	25	75	100	5
III	S2PHP2	CC4	Major Practical - II	3	40	60	100	5
III	S2AM2	Allied 2	Allied Mathematics - II	4	25	75	100	4
III	S2AM3	Allied 3	Allied Mathematics - III	3	40	60	100	4
IV	S2ES	ES	Environmental Studies	2	50	50	100	2
			TOTAL	30			700	26

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THANJAVUR-613 005.

PART	CODE	COURSE	TITLE	HRS	MARKS		TOTAL	CREDIT
			III SEMESTER		IE	WE		
I	S3T3	LT	PART I Tamil - III	6	25	75	100	3
II	S3E3	LE	PART - II English - III	6	25	75	100	3
III	S3PH3	CC5	Heat and Thermodynamics	6	25	75	100	5
III	S3PHP3	CC6	Major Practical - III	3	40	60	100	5
III	S3ACH1	Allied 4	Allied Chemistry - I	4	25	75	100	4
III	S4ACHP	Allied 6	Allied Chemistry Practical	3	-	-	-	
IV	S3SB1H	SB1	Home Appliance Maintenance and Servicing	2	50	50	100	2
			TOTAL	30			600	22
			IV SEMESTER					
I	S4T4	LT	PART I Tamil - IV	6	25	75	100	3
II	S4E4	LE	PART - II English - IV	6	25	75	100	3
III	S4PH4	CC7	Optics	6	25	75	100	5
III	S4PHP4	CC8	Major Practical - IV	3	40	60	100	5
III	S4ACH2	Allied 5	Allied Chemistry - II	4	25	75	100	4
III	S4ACHP	Allied 6	Allied Chemistry Practical	3	40	60	100	4
IV	S4SB2G	SB2	Computer Hardware and Networking	2	50	50	100	2
		TOTAL		30			700	26

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PART	CODE	COURSE	TITLE	HRS	MARKS		TOTAL	CREDIT
			V SEMESTER		IE	WE		
III	S5PH5	CC9	Atomic and Solid State Physics	6	25	75	100	4
III	S5PHP5	CC10	Major Practical - V	6	40	60	100	4
III	S5PHEL1A	MEC1	Electricity and Magnetism	6	25	75	100	4
	S5PHEL1B		Ultrosonics and its Applications					
	S5PHEL1C		Laser and Applications					
III	S5PHEL2A	MEC2	Basic Electrinics	6	25	75	100	4
	S5PHEL2B		Energy Physics					
	S5PHEL2C		Materials Synthesis and Characterization					
III	S5MELO1	NMEC1	Graph Theory	3	25	75	100	3
IV	S5SSD	SS	Soft Skill Development	2	50	50	100	2
IV	S5SB3J	SB3	Mobile Servicing	1	50	50	100	2
			TOTAL	30			700	23

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			VI SEMESTER					
III	S6PH6	CC11	Wave Mechanics and Nuclear Physics	6	25	75	100	4
III	S6PH7	CC12	Digital Electronics	6	25	75	100	4
III	S6PHP6	CC13	Major Practical - VI	6	40	60	100	4
III	S6PHEL3A	MEC3	Microprocessor and C Programming	6	25	75	100	4
	S6PHEL3B		X-ray Crystallography and Bio Physics					
	S6PHEL3C		Principles of Communication System					
III	S6ZELO2	NMEC2	Public Health and Hygiene	4	25	75	100	3
V	S6GS	GS	GENDER STUDIES	2	50	50	100	1
V	S6EA	EXT. ACTIVITIES	NSS/NCC/SPORTS/RED CROSS	-	-	-	-	1
			TOTAL	30			600	21
			GRAND TOTAL				3900	140

			Papers	Tot. Credit
PART-I	TAMIL		4x3	12
PART-II	ENGLISH		4x3	12
PART-III	CORE		8x5=40,5x4=20	60
	ELECTIVES		3x4	12
	ALLIED		6x4	24
PART - IV	NON-MAJOR		2X3	6
	ES,VE		2X2	4
	SKILL BASED		3X2	6
	SSD		1x2	2
	GS		1X1	1
PART - V	EXT. ACTIVITIES			1
	TOTAL PAPERS		39 TOTAL CREDIT	140

Separate Passing Minimum is prescried for Internal and External
a) The Passsing minimum for Cia shall be 40% out of 25 Marks(ie 10 Marks
b)The Passing minimum for Autonomous Examinations shall be 40% out of 75 marks (ie 30 Marks)

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THANJAVUR-613 005.

Credits   : 5

Hours/week : 6

Code : S1PH1

Medium: Tamil and English

(For students admitted from 2018-2019)

PROPERTIES OF MATTER AND SOUND

UNIT: I ELASTICITY

Hooke's law – Stress – Strain diagram – Different Moduli of Elasticity – Poisson's ratio – Relation between elastic constants – Work done in stretching a wire – Twisting couple per unit twist – Experimental determination of rigidity modulus by static torsion method –Torsional pendulum - Period of oscillations of Torsional pendulum – Experimental determination moment of inertia of the disc by torsional oscillations.

UNIT: II BENDING OF BEAMS

Beam – Expression for the bending moment – Cantilever – Depression of the loaded end of the cantilever - Experiment to find Young's modulus by Cantilever depression – Period of oscillation of a cantilever – Non-uniform bending – Expression for Depression - Experiment to determine Young's modulus using microscope –Uniform bending - Expression for Elevation – Experiment to determine Young's modulus mirror and telescope.

UNIT III: SURFACE TENTION

Cohesive and Adhesive forces – Explanation of surface tension on Kinetic theory – Angle of contact – Excess pressure inside a curved liquid surface (Synclastic) ,Liquid drop and Soap bubble – Experimental determination of surface tension of liquid and Liquid interface by drop weight method - Experimental determination surface tension of the liquid at different temperatures by Jaeger's method – Variation of surface tension with temperature.

UNIT IV: VISCOSITY

Streamline and turbulent motion – Expression for critical velocity – Significance of Reynold's number – Rate of flow of liquid in a capillary tube – Poiseuille's formula – Experiment to determine coefficient of viscosity of liquid (variable pressure head) – Searle's viscometer-Rotating cylinder method of finding coefficient of viscosity of viscous liquid - viscosity of gases – Meyer's formula - Effect of temperature and pressure on viscosity of liquids.

UNIT V: SOUND

Laws of transverse vibrations – Verification by Sonometer – Musical sound and noise – Characteristics of musical sound – Noise pollution – Practical applications – Siren – Microphone and loud speaker – Reverberation – Sabine reverberation formula - Factors affecting the acoustics of building – Sound distribution in auditorium – Requisites of good acoustics-Ultrasonic waves – Production by magnetostriction method – Applications of Ultrasonic waves.

BOOKS FOR STUDY:

1. Murugeshan.R, Kiruthiga Sivaprasath, Properties of Matter and Acoustics, , S. Chand Co Ltd..(2011).
2. Brijlal and Subramaniam.N, Properties of Matter –, S. Chand Co., Ltd (2001).
3. Brijlal and Subramanyam.N, A Text Book of Sound, 2nd Revised Edition, Vikas Publishing House Pvt. Ltd. (2000).

BOOKS FOR REFERENCE:

1. Mathur.D.S, Elements of Properties of Matter, S. Chand, Ltd (1968).
2. Subramanian Iyer and Jeyaraman, Properties of Matter.
3. Sharma.L.P, Saxena H.C. Oscillations, Waves and Sound.

Question Paper Pattern
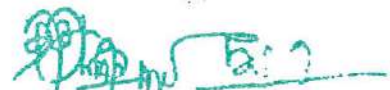
Maximum Marks:75 Marks   Exam Duration:3 Hrs

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)

Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)

Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

HOD Signature

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RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)

THANJAVUR-613 005.

Credits : 5
Code : S1PHP1
Hours/Week : 3
Medium : English and Tamil
Semester : 1

(For students admitted from **2018-2019**)

MAJOR PRACTICAL – I

(Choose any Ten only)

1. Young's modulus – Non uniform bending –Pin and microscope

2. Young's modulus - Non uniform bending – Single Optic lever.

3. Surface tension and Interfacial surface tension by drop weight method.

4. Coefficient of viscosity – Burette method.

5. Compound Pendulum – Determination of g and K.

6. Sonometer – Determination of frequency of a given tuning fork.

7. Sonometer- Determination of relative density of a solid and liquid.

8. Newton's law of cooling – Specific heat capacity of a given liquid.

9. Spectrometer – Refractive index of the prism (A,D and μ) .

10. Newton's rings-Determination of radius of curvature of a given convex lens R.

11. Meter bridge – Determination of resistance of two coils.

12. Potentiometer –Voltmeter calibration (low range).

13. Characteristics of given Junction and Zener diode.

14. Logic gates-Discrete components.

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இளநிலை பட்ட வகுப்பு – பகுதி IV

(2018-2019 ஆம் கல்வியாண்டு முதல் சேர்க்கப்பட்ட மாணவர்களுக்குரியது)

முதல் பருவம்

வாழ்வியல் கல்வி (Value Education)

அலகு - 1

வாழ்வியல் கல்வி ஓர் அறிமுகம், தனி மனித நெறிமுறைகள், சமுதாய நெறிமுன்றகள், ஆன்மீக நெறிமுறைகள், வாழ்வியல் நெறிகளின் மூலங்கள், வாழ்வியல் நெறிகளின் அவசியம், நன்னடத்தையும் நற்செயல்களும், நற்பண்புகள் உருவாக்கம்.

அலகு - 2

சமூக நற்பணி, சமூக நலப்பணித் திட்டங்கள், சமுதாயத் தீமைகள் குறித்த விழிப்புணர்வு, போதை மருந்துகளுக்கு அடிமையாதல், மதுப்பழக்கம், புகைப்பிடித்தல், தற்கொலை.

அலகு -3

இந்து சமயத்தின் போதனைகள், இஸ்லாம் போதிக்கும் நெறிகள், கிறித்துவம் போதிக்கும் நெறிகள், சமயச் சார்பின்மை, சமய நல்லிணக்கம்.

அலகு -4

காந்தியடிகளின் அகிம்சை கொள்கை, அன்னை தெரசாவின் தொண்டுகள், தன்னலமின்மையின் வடிவம் பெருந்தலைவர் காமராசர்.

அலகு - 5

சமூக நீதி, மனித உரிமைகளும் அவற்றின் பாதுகாப்பும், மகளிர்க்கு எதிரான வன்முறைகள், நாட்டின் ஒருமைப்பாடு.

Question Paper Pattern

Maximum Marks : 50   **Exam Duration : 3 Hours**

Part A - 5 x 4 = 20 (5 Out of 7 atleast 1 Question from each Unit)

Part B - 3 x 10 = 30 (3 Out of 5 - 1 Question from each Unit)

Credits : 5   Code :S2PH2
Hours/Week : 6   Medium : English and Tamil
(For students admitted from 2018-2019)

MECHANICS

Unit 1: PROJECTILE, IMPULSE & IMPACT

Projectile- Path of a projectile is a parabola – Range on a inclined plane – Impulse – Impact – Laws of impact – 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 kinetic energy – Motion of two interacting bodies

Unit 2: DYNAMICS OF RIGID BODIES

Kinetic energy of rotation – Angular momentum of a rotating body – Compound pendulum – equivalent simple pendulum – centre of suspension & centre of oscillation –centre of percussion – minimum period – Determination of g and radius of gyration of a bar pendulum.

Law of conservation of momentum – Center of mass - Velocity and Acceleration of centre of mass – System of variable mass- Equation of a Rocket motion – conservation of linear and angular momentum.

Unit 3: GRAVITATION AND CENTER OF GRAVITY

Newton's law of gravitation – Inertial and gravitation of mass - Determination of G Boy's method – Intensity of gravitational field - gravitational potential due to a point mass - Equipotential surface - Gravitational potential and Field due to a spherical shell –Centre of gravity of solid cone and tetrahedron – Centre of gravity of arc and sector of a circle.

Unit 4: CENTER OF PRESSURE

Centre of pressure of a rectangular with vortex on surface, base on the surface,triangular, circular lamina - effect of centre of pressure on further immersion - Metacentre - Experimental determination of a metacentric height of a ship - Variation of atmospheric pressure with altitude - height of the homogeneous atmosphere.

Unit 5: THEORY OF RELATIVITY

Newtonian and Galilean relativity -Galilean frames formations- Michelson Morley experiment and its importance – Einstein's postulates – Lorentz transformation – Relativity of space and time – Addition of velocities – Variation of Mass with velocity –Mass- Energy equivalence- Physical significance.

BOOKS FOR STUDY:
1. Mechanics Unit I & II M. Narayanamoorthy and N. Nagarethnam – NPC- Chennai.
2. Modern Physics: R. Mugrugesan, Kiruthiga sivaprasath S. Chand & Co Ltd New Delhi
3. Hydrostatics – M.Narayanamoorthy and N.Nagarethinam

BOOKS FOR REFERENCE:
1. Mechanics for B.Sc., Classes P. R. Subramaniam, T. Jayaraman and C. Rangarajan
S.V. Publishers Chennai.
2. Mechanics D.S. Mathur S. Chand & Co Ltd New Delhi.(2000)

Question Paper Pattern

Maximum Marks:75 Marks   Exam Duration:3 Hrs

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)

Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)

Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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Credits   : 5
Code   : S2PHP2
Hours/Week   : 3
Medium   : English and Tamil

(For students admitted from **2018-2019**)

MAJOR PRACTICAL-II

(Choose any Ten only)

1. Young's modulus – Uniform bending – Pin and microscope.

2. Young's modulus – Uniform bending – Optic lever (Scale and Telescope).

3. Surface tension by capillary rise method.

4. Comparison of viscosities of the given two liquids .

5. Melde's string -Determination of frequency of a given tuning fork (Longitudinal and Transverse modes).

6. Sonometer –Verification of laws of vibrations of a stretched string.

7. Sonometer- AC frequency determination.

8. Lee's disc –Specific heat capacity of the bad conductor.

9. Spectrometer – Hollow prism-μ of a given liquid.

10. Air Wedge- Determination of thickness of a thin fibre.

11. Meter bridge – Verification of laws of resistance.

12. Potentiometer –Ammeter Calibration.

13. Full wave rectifier – Bridge type.

14. Logic gates – Truth table verification using IC's (NOT,AND, OR, NAND, NOR)

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இளநிலை பட்ட வகுப்பு – பகுதி IV

(2018-2019 ஆம் கல்வியாண்டு முதல் சேர்க்கப்பட்ட மாணவர்களுக்குரியது)

இரண்டாம் பருவம்

சுற்றுச்சூழல் அறிவியல்

அலகு - 1

சுற்றுச்சூழல் அறிவியலின் பல்துறை ஆய்வு அணுகுமுறை - சுற்றுச்சூழல் வகைகளும், கூறுகளும் - சுற்றுச்சூழல் அறிவியலின் வாய்ப்புகள் - சுற்றுச்சூழல் அறிவியலின் முக்கியத்துவம் - சுற்றுச்சூழல் கல்வியில் பல்துறை அணுகுமுறையின் பங்கு - பொதுமக்களிடையே சுற்றுச்சூழல் விழிப்புணர்வின் தேவை - சுற்றுச்சூழல் குறித்து பொதுமக்களின் விழிப்புணர்வு - இயற்கை வளங்கள் - புதுப்பிக்கக்கூடிய மற்றும் புதுப்பிக்க இயலாத வளங்கள் - இயற்கை வளங்களும் அதன் பிரச்சனைகளும் - வன வளம், நீர் வளம், கனிம வளம் - உணவு வளம், சக்தி வளம், நில வளம் - இயற்கை வளங்களைப் பாதுகாப்பதில் ஒவ்வொருவரின் பங்கு - நீடித்த வாழ்க்கை முறைக்கு வளங்களின் சமமான பயன்பாடு.

அலகு - 2

சூழல் தொகுப்பு - சூழல் தொகுப்பின் அடிப்படைக் கொள்கைகள் - சூழல் தொகுப்பின் அமைப்பு மற்றும் செயல்கள் - உயிர் புவி வேதியியல் சுழற்சி - ஆற்றலும் அது சூழல் தொகுப்பில் பாய்தலும் - சூழியல் வழிமுறை தொடர் வளர்ச்சி - உணவுச் சங்கிலி மற்றும் உணவு வலை - சூழல் தொகுப்பின் முப்பட்டை கோபுரம் - சூழல் தொகுப்புகளின் வகைகள், பண்புகள், அமைப்பு, செயல்கள் - நிலச்சூழல் தொகுப்பு, நீர்ச்சூழல் தொகுப்பு.

அலகு -3

உயிரின வளம் மற்றும் அதன் பாதுகாப்பு - உயிரின வளம் - வரையறை - இந்தியாவின் உயிர்புவியியல் வகைப்பாடு - உயிரின வளத்தின் மதிப்புகள் - உலகளாவிய, தேசிய மற்றும் மாநில அளவிலான உயிரின வளம் - இந்தியா ஓர் உயிரின வளமிக்க தேசம் - உயிரின வள செழுமை இடங்கள் - உயிரின வளத்தின் அச்சுறுத்தல்கள் - இந்தியாவில் உள்ள அபாயத்திற்குள்ளாகிய சிற்றினங்கள் மற்றும் இடச்சூழல் சிற்றினங்கள் - உயிரின வளப்பாதுகாப்பு - சுற்றுச்சூழல் மாசுபாடு - வரையறை, மூலங்கள், விளைவுகள் மற்றும் கட்டுப்படுத்தும் வழிமுறைகள் - காற்று மாசுபாடு, நீர் மாசுபாடு - மண் மாசுபாடு - கடல்நீர் மாசுபாடு - இரைச்சல் மாசுபாடு - வெப்ப மாசுபாடு - கதிரியக்க ஆபத்து - திடக்கழிவு : மூலங்கள், விளைவுகள், கட்டுப்படுத்தும் முறைகள், நகர மற்றும் தொழிற்சாலைக் கழிவுகள் - மாசுக்கட்டுப்பாட்டில் தனி மனிதனின் பங்கு - உதாரண சாட்சியங்கள் - இயற்கைச் சீற்றங்களும் அவற்றைத் தடுக்கும் வழிமுறைகளும் வெள்ளம், நிலநடுக்கம், புயல் மற்றும் நிலச்சரிவு.

Credits	: 5	Code	: S3PH3
Hours/Week	: 6	Medium	: English and Tamil

HEAT AND HERMODYNAMICS

Unit 1: TRANSMISSION OF HEAT
Modes of heat transfer - Coefficient of Thermal Conductivity –- Radial flow of heat – Lee's Disc method for bad conductors – Black body radiation – Wein's law – Raleigh Jean's law - Plank's law of Black body radiation - Stefan's law – Mathematical derivation – Newton's law of cooling from Stefan's law –Experimental verification – Stefan's constant – Experimental determination.

Unit 2: SPECIFIC HEAT
Specific Heat – Principle of calorimeter - Specific Heat of gas – Types – Mayer's relation - Specific Heat of a gas at Cv by Joly's Steam Calorimeter – Cp by Regnault's Method – Specific heat of liquid by Joule's calorimeter – Specific heat of solids – method of mixtures - Dulong and Petit's Law – Variation of Specific Heat and Atomic Heat with Temperature.

Unit 3: LOW TEMPERATURE PHYSICS
Van der waals equation of state – critical constants (PVT) – Joule Kelvin effect – Inversion temperature –Liquefaction of air by Linde's process – liquefaction of Helium by K. Onnes method – properties of Helium I and Helium II – Adiabatic demagnetisation.

Unit 4: THERMODYNAMICS
Zeroth, first and second laws of thermodynamics – reversible and irreversible processes ← Isothermal and Adiabatic processes – workdone – Carnot's engine – efficiency – thermodynamical scale of temperature - Clapeyron Latent heat equation – Entropy – Change of Entropy in a Reversible and Irreversible Process – 3rd Law of Thermodynamics – T-S Diagram – Entropy of a Perfect Gas – Derivation of Maxwell's Thermodynamical Relations.

Unit 5: STATISTICAL THERMODYNAMICS
Statistical equilibrium –M.B. distribution law –M.B. distribution law in terms of temperature – application to ideal gas – Quantum Statistics – Phase space – Fermi-Dirac Distribution Law – Electron gas – Fermi energy – Bose – Einstein Distribution Law – Photon gas – Comparison of three statistics.

LIST OF BOOKS FOR STUDY:
1. Heat and Thermodynamics - Brijlal and Subramanium. S.Chand Publishers [1998]
2. Heat and Thermodynamics - J.B.Rajam. S.Chand Publishers
3. Heat – M. Narayanamurthi and N. Nagaratnam.

Question Paper Pattern

Maximum Marks:75 Marks   **Exam Duration:3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)

Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)

Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

HOD Signature

HEAD,
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CONTROLLER OF EXAMINATIONS,
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THANJAVUR-613 005.

Credits   : 5
Code   : S3PHP3
Hours/Week   : 3
Medium   : English and Tamil

(For students admitted from **2018-2019**)

MAJOR PRACTICAL-III

(Choose any Ten only)

1. Young's Modulus- Cantilever (Scale and Telescope).

2. Young's Modulus –Cantilever (Pin and Microscope).

3. Static Torsion-Rigidity Modulus.

4. Specific heat capacity of a given liquid-Joules calorimeter.

5. Specific heat capacity of a given solid –Method of mixtures.

6. Spectrometer – (i-d) curve.

7. Spectrometer- Grating- Normal Incidence.

8. Potentiometer – Resistance of a coil.

9. Tan A and Tan B position- Magnetic moments of a given magnet.

10. Figure of merit- Table Galvanometer.

11. Transistor characteristics – CE Configuration.

12. Voltage Doubler and Tripler.

13. Zener regulated power supply- % of regulation.

14. Verification of De Morgans Theorems.

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THANJAVUR-613 005.

Credits   : 4   Code   :S3ACSP1
Hours/Week : 4   Medium   : English

(For students admitted from 2018-2019)

APPLIED PHYSICS – I

Unit 1: ELECTROSTATICS

Fundamentals of electrostatics – Gauss theorem and its applications -Mechanical force on the surface of a charged conductor- Electro statistics energy in the medium- Capacitors- Principles of a capacitor -Capacity of an isolated sphere -Energy of a charged capacitor - Loss of energy due to sharing of charges.

Unit 2: MAGNETOSTATICS

Magnetic field- magnetic flux density – magnetization – Intensity of magnetization- Permeability – Susceptibility – relation between them – magnetic potential – potential due to a dipole – relation between potential and intensity – magnetic shell and its potential at any point – Properties of dia, para and ferromagnetic materials.

Unit 3: CURRENT ELECTRICITY

Laplace law – Ohm's law – Kirchoff's law- Application to Wheatstone bridge – Carrey Foster's bridge – Potentiometer – Measurement of current and resistance– Calibration of low range voltmeter – Fleming's left hand rule – Theory of moving coil galvanometer.

Unit 4: ELECTROMAGNETIC INDUCTION

Laws of electromagnetic induction-Relation between induced emf and mutual induction – self-induction by Rayleigh' method – mutual induction – coefficient of coupling – absolute determination of M (B.G) – Transformer principle, construction and working.

Unit 5: ALTERNATING CURRENT

A/C circuits with single components- Circuit with RL, RC, and LC -measurement of current and voltages – power in an AC circuit – Power factor- Parallel and series resonant circuits – Choke coil.

BOOKS FOR STUDY:

1. Applied physics – Paper I –A.Sundaravelusamy – Priya publications Karur 2012.
2. Electricity and Magnetism – Brijlal and Subramanian, Ratan Prakashan Mandir, New Delhi 2000.
3. Electricity and Magnetism – Narayanamurthy & Nagarathinam.
4. Electricity and Magnetism –D.L. Seghal and Chopra.

Question Paper Pattern

Maximum Marks: 75 Marks   **Exam Duration: 3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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THANJAVUR-613 005.

Credits	: 4		Code	: S3AP1
Hours/Week	: 4		Medium	: English and Tamil

<div align="center">(For students admitted from 2018-2019)</div>

ALLIED PHYSICS – I

Unit 1: MECHANICS

Centre of gravity – Determination of C.G – Centre of gravity of a solid, hollow hemisphere and Solid cone – Gravitation: Kepler's Law of Planetary motion – Newton's laws of gravitation – Deduction of Newton's law of gravitation from Kepler's law – Boy's method of determination of G – Variation of 'g' with latitude, altitude and depth.

Unit 2: SOUND

Simple harmonic motion – Differential equation of SHM – Music and noise – Characteristics of musical sound – Reverberation and Reverberation time – Determination of reverberation time by Sabine's formula – Conditions for good acoustics – Ultrasonics – Production – Piezo electric oscillator Properties – Applications.

Unit 3: PROPERTIES OF MATTER

Hooke's Law – Stress – Strain – Elastic modulii – Bending of beams – Expression for bending moment – Non Uniform bending – Expression for depression - Determination of Young's modulus – Definition and dimensions of surface tension - Examples – Jaeger's Experiment – Osmosis and osmotic pressure – Laws of pressure.

Unit 4: THERMAL PHYSICS

Laws of thermodynamics – Isothermal and adiabatic changes – Reversible and irreversible process – Carnot's theorem – Newton's Law of cooling – Stefan's law of radiation-Newton's law from Stefan's law – Black body radiation – Solar constant – Measurement of solar constant – Angstrom's pyroheliometer – temperature of the sun.

Unit 5: OPTICS

Electromagnetic Spectrum – Spectral response of human eye – UV and IR spectroscopy – Raman Effect – Experimental Arrangement – Application of Raman Effect – Laser – Spontaneous and stimulated emission – Population inversion – CO_2 laser – Semiconductor laser.

BOOKS FOR STUDY / REFERENCE:

1. Mechanics - D.S.Mathur.S.Chand & Co New Delhi 2012.
2. A Text Book of Sound - Brijilal and Subramanian S.Chand & Co New Delhi 2011.
3. Properties of Matter - R.Murugeshan. S.Chand & Co New Delhi 2012.
4. Heat and Thermodynamics - Brijlal and Subramanian. S.Chand & Co New Delhi 2013.
5. A text book of Optics - Brijlal and Subramanium. S.Chand & Co New Delhi 2013.
6. Allied Physics Paper I - A.Sundaravelusammy. Priya Publications 2012.

<div align="center">

Question Paper Pattern

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Maximum Marks: 75 Marks   **Exam Duration: 3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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THANJAVUR-613 005.

Credits: 2.

code: S3SB1H.

ELECTRONICS

Skill Based Elective I (Semester IV)

HOME APPLIANCE MAINTENANCE AND SERVICING

Objective

To explain the operation and troubleshooting techniques of home appliances

UNIT I Electronic components:

Introduction–Passive components–Transformer–Working principle–application–Active devices: Diode–Transistor– Analog IC–amplifier– oscillators and Digital ICs–logic gates–encoder–decoder.

Unit II Equipments for servicing

Soldering Iron–Flux–lead–Zero defect soldering–Desoldering pump– soldering station–Basics of Multimeter–Measurement of current, voltage and resistance using multimeter–Checking transistors and diodes–In circuit measurements.

Unit III. Heating appliances

Heater types–working principle– Heating Rod–Iron Box–Iron box with steamer–Toasters– Geysers– MicroWave Ovens– Oven –Disassembling and assembling procedure– Fault indicator–Testing and Troubleshooting methods.

Unit IV Motorised appliances

Types of Motors–DC and AC motor– Fans– mixers– blenders–wet grinders– circuit connection- testing methods. Washing machine–Electrical connections–assembly–Dish washer –Electrical connection–Testing and Trouble shooting methods.

Unit V Refrigeration appliances

Fridge– Electrical connection– Compressor–coolants–Automatic defrost circuits –Testing and troubleshooting of refrigerators–Air coolers and Air conditioners–Mounting and fixing of Air Conditioners–testing and troubleshooting methods.

Text Book

1. Eric Kleinert, Troubleshooting and Repairing major appliances, Mc Graw Hill,McGraw Hill Professional, third edition, 2012.

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Question pattern:

Max. Marks : 50

Exam. Duration: 3 hrs.

Part A - 5×4 = 20 ₁ (5 out of 7 atleast 1 Question from each).

Part B - 3×10 = 30 (3 out of 5 - 1 Question from each Unit)

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(For students admitted from 2018-2019)

OPTICS

Unit 1: GEOMETRICAL OPTICS

WAVE OPTICS: Nature of light-Theories of light-Electromagnetic nature of light. Definition of a wavefront-propagation of a wave front-Huygen's principle of secondary wavelets.

DEFECTS OF IMAGE: Monochromatic aberration and Chromatic aberration-Spherical aberration in a lens -Methods of minimizing the spherical aberration - Chromatic aberration in a lens - Condition for achromatism for two thin lenses in contact, separated by a distance.

Unit 2: INTERFERENCE

Principle of superposition-Coherence-Temporal Coherence and Spatial Coherence- Condition for interference of light- Dark and bright fringes - Fresnel's biprism – Double slit interference (Theory of interference fringes and bandwidth)-Interference in thin films - Wedge shaped films-Testing of optical flatness- Newton's rings (reflected system)- Determination of Wave Length – Refractive index of a liquid-Michelson's interferometer - Determination of Wave Length.

Unit 3: DIFFRACTION

FRESNEL DIFFRACTION: Half period zones - Explanation of rectilinear propagation of light - Diffraction at a circular aperture - diffraction at a straight edge - Zone plate.

FRAUNHOFER DIFFRACTION: Construction of half period zones - Zone plate - Construction, theory -Comparison of zone plate and convex lens - Fraunhofer diffraction at a single slit,double slit – Plane transmission grating-Rayleigh's criterion for resolution- Resolving power of a prism and diffraction grating –Dispersive power of a grating.

Unit 4: POLARISATION

Plane polarized light-Polarization by reflection-Brewster's law - Pile of plates –Malus law-Double refraction –Huygen's explanation for double refraction in Uni axial crystals - Nicol Prism – Nicol prism as a polarizer and analyzer - Quarter wave plate and Half wave plate - Specific rotation – Laurentz half shade polarimeter.

Unit 5 : LASERS

Introduction to Laser –Characteristics- Basic components of a laser-Metastable states – Population Inversion and lasing action – Optical pumping – Spontaneous and Stimulated emission – Einstein's. coefficients A,B –Laser systems: CO_2 laser – Nd:YAG laser-Semiconductor laser- Applications.

BOOKS FOR STUDY:

1. Optics and Spectrosopy by R.Murugesan.(2010).
2. Optics and Spectroscopy by N.Subramanian and Brijlal.S.Chandn Co.,(1992).
3. An Introduction to LASERS Theory and Applications – M. N. Avadhanulu(S.Chand and Co.2004)

BOOKS FOR REFERENCE:

1. Engineering physics   – G.Vijayakumari. (Vikas Publications 2013)
2. A Text Book of Optics   – Brijlal and Subrahmanyam(S.Chand and Co. 2004)

Question Paper Pattern

Maximum Marks:75 Marks   **Exam Duration:3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)

Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)

Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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THANJAVUR-613 005.

Credits   : 5
Code   : S4PHP4
Hours/Week : 3
Medium   : English and Tamil

(For students admitted from **2018-2019**)

MAJOR PRACTICAL – IV

(Choose any Ten only)

1. Torsional pendulum – Determination of Rigidity modulus (Without symmetrical masses).

2. Torsional pendulum – Determination of Rigidity modulus (With symmetrical masses).

3. Stokes method – Determination of the viscosity of a given liquid.

4. Spectrometer –Grating –Minimum Deviation –Wavelength determination.

5. Spectrometer- Dispersive power of a grating.

6. Carey Foster's Bridge-Specific Resistance of a given coil.

7. Potentiometer- Temperature co-efficient of a given coil.

8. Tan C – Determination of M & BH.

9. Field along the axis of a coil- H determination.

10. Field along the axis of a coil- Magnetic moment determination.

11. Transistor characteristics – CB Configuration.

12. LCR -Series & Parallel resonance circuit.

13. Associative law and Distributive law- Verification.

14. Construction of dual power supply (9-0-9V).

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ALLIED PHYSICS – II

Unit 1: ELECTROSTATICS

Coulomb's law – Gauss theorem – Applications – Mechanical force on the surface of charged conductor – Capacitors – Principle of a capacitor - Capacity of an isolated sphere – Cylinderical capacitor – Energy of a charged capacitor - Loss of energy due to sharing of charges.

Unit 2: ELECTRICITY

Kirchoff's Laws – Wheatstone's bridge – Condition for bridge balance – Carey Fosters bridge – Determination of resistance – Variation of resistance with temperature - Laws of Electromagnetic induction – Self induction – Raleigh's method of finding self inductance of a coil – Mutual induction – Absolute determination of M – Coefficient of coupling.

Unit 3: ATOMIC PHYSICS

Quantum numbers – Vector atom model – Spin orbit interaction – Spectral terms – Selection rule – Pauli's exclusion principle – X-rays – Continuous and characteristic X-rays – Mosley's law and its importance - Bragg's law and spectrometer – Powder crystal method.

Unit 4: NUCLEAR PHYSICS

Characteristics of nuclear forces – nuclear structure by liquid drop model – Binding energy – Packing fraction – mass defect – particle accelerators – Cyclotron and betatron – Nuclear fission – Chain reaction – Nuclear fusion – elementary particles – Leptons, Mesons and Baryons.

Unit 5: ELECTRONICS AND DIGITAL ELECTRONICS

Semiconductors – Junction diode – Characteristics study – Zener diode – Characteristics study – Principles of LED and LCD – Transistor – Mechanism of amplification – Modes of operation – Number systems – Binary, Decimal, Octal, Hexa-decimal – Basic and universal logic Gates – Demorgan's Theorem – Verification.

BOOKS FOR STUDY / REFERENCE:

1. Electricity and Magnetism – Brijlal and Subramaniam S.Chand & Co New Delhi 2013.
2. Modern Physics – R.Murugesan S.Chand & Co New Delhi 2014.
3. Principles of Electronics – V.K Mehtha S.Chand & Co New Delhi 2013.
4. Digital Principles and Applications – Albert Paul Malvino and Donald P. Leach Tata McGraw Hill 2011.
5. Allied Physics II – A. Sundara velusamy Priya Publications Karur 2012.

Question Paper Pattern

Maximum Marks: 75 Marks   **Exam Duration: 3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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THANJAVUR-613 005.

Credits : 4   Code : S4ACSP2
Hours/Week : 4   Medium : English

(For students admitted from 2018-2019)
APPLIED PHYSICS-II

Unit 1: SEMICONDUCTOR PHYSICS

Theory of energy bands in crystals -Distinguish between Conductors - Insulators and semiconductors - Hall effect in semiconductors -Junction diode –Half wave rectifier-Full wave rectifier – Bridge rectifier -Zener diode - Zener diode as voltage regulators.

Unit 2: TRANSISTORS

PNP and NPN Transistors-Transistor Action-DC characteristics of CE and CB configuration-Hybrid Parameters- Transistors as an amplifier, Oscillator- FET - N channel and P channel FET -performance – Characteristics- FET Amplifier.

Unit 3: LASER AND MASERS

Basic concepts of stimulated emission – Optical pumping - population inversion and meta stable state - Ammonium Maser - Ruby laser and He - Ne laser production – Application of laser.

Unit 4: OPTO ELECTRONIC DEVICES

Photo electric effect - Laws of Photo electric emission - Einstein's Photo Electric Equation - Photo electric cell - Photo voltaic cell - Applications - Light Emitting Diode - photo Transistors - Electronic Watches - Seven segment display - LCD.

Unit 5: OPERATIONAL AMPLIFIERS AND INTEGRATED CIRCUITS

The Basic Operational amplifier - Inverting and Non inverting Operational amplifier - Differential Operational amplifier - CMRR- Basic uses of Operational amplifier - Adder - Subtractor -Integrator-Differentiator - D/A Converter - R-2R ladder method - A/D converter successive approximation method - Integrated circuit - Fabrication.

LIST OF BOOKS FOR STUDY / REFERENCE:

1. Applied Physics - Paper II- A.Sundaravelusamy -Priya Publications Karur 2012
2. Basic Electronics(solid state) - B.L. Theraja, S.Chand (2007)
3. Principles of Electronics – V.K.Mehta, Rohit Mehta, S.Chand & Co New Delhi (2013)
4. Microelectronics –Jacob Millman –McGrawHill.
5. Functional Electronics – Ramanan –TMH,1994.
6. The fundamentals of Solid state physics – Theraja Sultan Chand & Co.., Delhi.

Question Paper Pattern

Maximum Marks: 75 Marks   **Exam Duration: 3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

HOD Signature

HEAD,
DEPARTMENT OF PHYSICS,
RAJAH SERFOJI GOVT. COLLEGE,
THANJAVUR-613 005.

CONTROLLER OF EXAMINATIONS,
RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits   : 4
Code   : S4APP
Hours/Week   : 3
Medium   : English and Tamil

(For students admitted from **2018-2019**)

ALLIED PRACTICAL

(Choose any Fourteen only)

1. Non uniform bending – Pin and Microscope Method
2. Uniform bending – Pin and Microscope Method
3. Non uniform bending – Scale and Telescope.
4. Uniform bending - Scale and Telescope.
5. Surface Tension and Interfacial Tension – Drop Weight Method
6. Coefficient of Viscosity of liquid using graduated burette
7. Specific heat capacity of liquid by cooling Method
8. Lee's Disc – Thermal Conductivity of Bad Conductor
9. Spectrometer – Grating – minimum deviation method
10. Spectrometer Refractive index of Solid Prism (A, D and μ)
11. Newton's Rings – Radius of curvature of a convex lens
12. Sonometer – Verification of Three Laws
13. Carey Foster's Bridge – specific Resistance
14. Meter Bridge – Verification of Resistance in Series and Parallel
15. EMF of thermocouple – Direct Deflection method
16. Characteristics of a junction diode
17. Characteristics of a zener diode
18. AND, OR and NOT logic gates – Verification of truth table using Discrete Components.
19. Meter Bridge – Determination of specific Resistance
20. Potentiometer – Low range voltmeter calibration
21. Bridge rectifier - Construction

LIST OF REFERENCE BOOKS:

1. A textbook of practical physics – M.N Srinivasan and others – Sultan Chand & sons, New Delhi.
2. Practical Physics – A. Dhana Lakshmi and K.R. Paramasivam – Apsara Publication, Trichy.

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THANJAVUR-613 005.
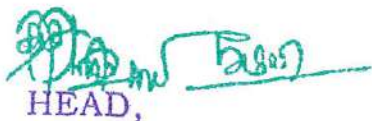
APPLIED PHYSICS PRACTICAL

(Choose any **Fourteen** only)

1. Carey Foster's Bridge – resistance and specific resistance.
2. Potentiometer – Resistance and specific resistance.
3. Potentiometer – calibration of ammeter.
4. Field along the axis of the coil-determine the magnetic flux using deflection magnetometer.
5. Moment of a magnet using a coil carrying current.
6. Series and parallel resonant circuit.
7. Characteristic of a diode.
8. Zener diode - Characteristics.
9. Static characteristic of transistor – common emitter configuration.
10. Bridge rectifier.
11. Zener controlled voltage regulator.
12. Characteristics of FET.
13. AND, OR, NOT, gates using discrete components
14. Potentiometer – High range voltmeter.
15. Voltage doubler and tripler.
16. Verification of logic gates using IC's.
17. Potentiometer – low range voltmeter calibration
18. Op Amp – Adder, subtractor

List of Reference Books:

1. A textbook of practical physics – M.N Srinivasan and others – Sultan Chand & sons, New Delhi.

2. Practical Physics – A. Dhana Lakshmi and K.R. Paramasivam– Apsara Publication, Trichy.

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THANJAVUR-613 005.

Skill Based Elective II (Semester V)

COMPUTER HARDWARE AND NETWORKING

UNIT I Processor, Memory and Mother Board

Basic PC concepts-Processor-Intel dual core –i core-AMD –Athlon –Processor speed- 12-13 cache memory-Processor Sockets –Heat sink-processor and heat sink mounting – Memory-DDR2-DDR3-DDR4-RAM sockets –FSB and mounting- Motherboard organization-chip set-PCI slot-Type of mother boars-front and Rear panel organization-BIOS and setting.

UNIT II STORAGE DEVICES

Introduction-Magnetic Storage devices – Hard disk organization –hard disk type-PATA-SATA-SCSI-SAS—hard disk partition-formatting – Introduction -Optical storage devices-CD-DVD-Drive type-Connectors and connections –USB storage devices.

UNIT III INPUT AND OUTPUT DEVICES

Keyboard type-AT and Ps/2 keyboards- connectors- Mouse-type-working-Display card- display memory-VGA –DVI-HDMI-ports-Monitors-CRT-LCD-LED monitors-principle and working-Printers-Dot matrix-Inkjet-laser printers introduction-type – interface type and connectors-connection-installation.

UNIT IV SYSTEM ASSEMBLING

SMPS – cabinets – types – SMPS – Testing - voltage measurements - stepwise assembling procedure-Device interconnections-Operating system installation-device driver installation-System installation and testing-report generation.

UNIT V COMPUTER NETWORK

Network fundamentals – Ethernet card – Ethernet port – cat5 - cat6 cable - RJ45 connector crimping and colour code-T568A-T568B-network switch-router-wireless Access point-IP setting-Home-network setting-internet connection setting.

Text books:

1. Scott Mueller, Upgrading and Repairing PC's 20th edition

Reference Book:

1. Mark L. Chambers, Build Your Own PC Do-It-Yourself For Dummies Dummies series.

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Question Pattern

Exam Duration : 3 hrs

max. Marks : 50.

Part A – 5×4 = 20 (5 out of 7 atleast, 1 question from each unit)

Part B - 3×10 = 30 (3 out of 5, 1 question from each unit).

HEAD,
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CONTROLLER OF EXAMINATIONS
RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)

| Credits | : 4 | Code | : S5PH5 |
| Hours/Week | : 6 | Medium | : English / Tamil |

(For students admitted from 2018-2019)

ATOMIC AND SOLID STATE PHYSICS

Unit 1 : ATOMIC STRUCTURE

Excitation of atoms – Critical Potential – Excitation Potential – Ionisation Potential – Experimental determination of critical potential – Frank and Hertz's method – Sommerfield atom model – Qualitative treatment – Derivation of condition for the allowed elliptical orbits – Vector atom model - Quantum numbers associated with Vector atom model-Coupling schemes – L-S and J J coupling _ Pauli's exclusion principle and verification .

Unit 2: FINE STRUCTURE OF SPECTRAL LINES

Magnetic dipole moments due to orbital and spin motion – Selection rule for electron transition – Intensity rules – Interval rule – Fine structure of D line – Zeeman effect – Normal and Anomalous (Experimental study and results) – Debye's theory of normal Zeeman effect – Lorentz theory of anomalous Zeeman effect - Paschen Back effect and Stark Effect (definition only).

Unit 3: X-Rays

Origin of X-Rays – Polarization of x-rays-Absorption of X-Rays – Continuous, Characteristic X-Rays –Mosley's Law –Mosley's Law and its importance - Bragg's law – Bragg X-ray spectrometer –Powder crystal method –Rotating Crystal method-Compton Effect – Theory – Experimental Verification.

Unit 4: PHOTO ELECTRICITY

Photo electric effect – laws of photoelectric emission -Einstein's photo electric equation- Richardson and Compton Experiment – Millikan's Experiment – verification of Einstein's equations –determination of Plank's constant-Photo electric cells - Photo Emissive, Photo Voltaic, Photo Conductive cells – Photo Multiplier – Applications of photo electric cells.

Unit 5: CRYSTAL STRUCTURE

Types of solids – Crystalline and Amorphous solids - Space Lattice – The Basis and the crystal structure unit cell and Primitive lattice cell – Lattice parameter – Symmetry elements in a cubic crystals - Point groups – Bravais lattice in two dimension – Seven crystal systems – coordination number for SC, BCC and FCC - Miller Indices – Features of miller indices – Crystal Structure – Nacl, Diamond, Zinc Blende,KCl.

BOOKS FOR STUDY:

1. Modern Physics by R.Murugesan S.Kiruthiga Sivaprasad.S.Chand Publishers(2012).
2. Modern Physics by Sehgal Chopra Sehgal S.Chand Publishers
3. Mordern Physics by J.B. Rajam.(1967).
4. Solid state physics by Gupta Kumar.Vikas Publishing Pvt., Ltd., (2001).
5. Solid State Physics – R- L Singhal. Wiley Eastern Ltd.

BOOKS FOR REFERENCE:

1.Modern Physics by B.L. Theraja.S.Chand (2008).
2.ModernPhysics by Beiser.Tata McCraw Hill (1967).
3.Solid state physics by Saxena Gupta Saxena .Pragati Prakashan.

Question Paper Pattern

Maximum Marks:75 Marks   **Exam Duration:3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

HOD Signature

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THANJAVUR-613 005.

CONTROLLER OF EXAMINATIONS,
RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits   : 4
Code   : S5PHP5
Hours/Week   : 3
Medium   : English and Tamil

(For students admitted from **2018-2019**)
MAJOR PRACTICAL – V
(Choose any Fourteen Experiments)

1. Young's Modulus - Koenig's method-(Non-Uniform Bending).

2. Spectrometer – (i- i') curve.

3. Spectrometer – Cauchy's Constants A &B.

4. B.G – Figure of Merit – Voltage and Current Sensitiveness.

5. B.G- Absolute Capacitance.

6. Potentiometer- Thermistor- Temperature co-efficient.

7. Potentiometer- High Range Voltmeter Calibration.

8. Carey Foster's Bridge –Temperature Co-efficient of a given coil.

9. Transistor –Single Stage Amplifier.

10. FET- Characteristics.

11. Operational Amplifier- Inverting and Non- Inverting.

12. Operation Amplifier – Adder and Subtractor.

13. Hartley Oscillator – Frequency and Self-inductance (L).

14. Half Adder, Full Adder using basic logic gates-IC.

15. NAND, NOR Universal gates – Verification.

16. Multiplexer and Demultiplexer.

17. Microprocessor – 8 bit addition and subtraction.

18. Microprocessor – 8 bit multiplication and division.

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CONTROLLER OF EXAMINATIONS,
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THANJAVUR-613 005.

Credits	: 4	Code	: S5PHEL1A
Hours/Week	: 7	Medium	: English and Tamil

(For students admitted from 2018-2019)

ELECTRICITY AND MAGNETISM

Unit 1: ELECTROSTATICS

Coulomb's law – Gauss's Law – Application – Intensity at a point due to a charged sphere and cylinder - electric potential – relation between electric field and electric potential – Principle of capacitor – capacity of a spherical and cylindrical capacitors – energy stored in a capacitor – loss of energy due to sharing of charges.

Unit 2: CURRENT ELECTRICITY

Kirchhoff's Laws of Electricity - Wheatstone's bridge – Carey Foster's Bridge – Potentiometer – calibration of Ammeter and Voltmeter – Ampere's circuital law – Field along the axis of a circular coil - Seebeck effect, Peltier effect, Thomson effect – Thermodynamics of thermocouple - Determination of Thomson, Peltier coefficients - Thermo electric diagrams.

Unit 3: ELECTROMAGNETIC INDUCTION

Laws of Electromagnetic Induction – Self and Mutual induction - Self-Inductance by Raleigh's Method - experimental determination of mutual inductance – coefficient of coupling – Charge and Discharge of a Capacitor through a resistor – Measurement of high resistance by leakage.

Unit 4: ALTERNATING CURRENT

Mean and RMS value of AC current - LC, LR, CR - AC Circuits - Series and Parallel resonance circuit – Resonance condition – Q factor – Wattless current - choke coil – Transformer – theory with and without load – uses - skin effect.

Unit 5: MAGNETIC PROPERTIES OF MATERIALS

Magnetic field – intensity of magnetisation - Permeability, Susceptibility (Definition only) - Relation between them – Properties of dia, para and ferro magnetic materials –Langevin's theory of dia and Para magnetism –B-H curve-Energy loss due to hysteresis –Importance of hysteresis curves.

BOOKS FOR STUDY:

1. Electricity and Magnetism by R. Murugesan, S. Chand & Company Ltd.New Delhi (2008).

2. Electricity and Magnetism by Brijlal and N. Subramanian,Ratan Prakashan Mandir Agra, (2000).

BOOKS FOR REFERENCES:

1. Electricity and Magnetism by D.L. Sehgal, K.L. Chopra and N.K. Sehgal.5th Edition S. Chand & Sons. New Delhi (1996).

Question Paper Pattern

Maximum Marks:75 Marks   **Exam Duration:3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)

Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)

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RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 4   Code : S5PHEL1B

Hours/Week : 6   Medium : English and Tamil

Semester : 5

ELECTIVE COURSE
ULTRASONICS AND ITS APPLICATIONS

UNIT I : Source of Ultrasonic waves

Piezo electric - magnetostrictive transducers, electromechanical coupling factors and transducer efficiency - Transducers and band width characteristics - Equivalent electrical circuit of piezoelectric vibrators. Detection of ultrasonic waves: - Mechanical, thermal, electrical and optical methods.

UNIT II : Techniques used in ultrasonic investigations

Interferometer, Optical, pulse, sing-around, radiation pressure and streaming methods – Measurement of propagation constants in different media – Relative merits of the techniques – Diffraction effects of sound velocity and absorption measurements – Hypersonic velocity and absorption measurements.

UNIT III : Propagation of ultrasonic waves in liquids

Propagation of ultrasonic waves in liquids: mixtures. Excess compressibility and the relation to excess volume – Excess intermolecular free length – relative association. Sound velocity and compressibility of electrolytic solutions – Dispersion of sound in liquids – Different mechanisms of the absorption of sound – Relaxation phenomenon.

UNIT IV : Dielectric measurements

Continuous wave and pulse techniques for measuring elastic constants of solids - Determination of elastic constants of cubic crystals – Dielectric behavior of materials – Dipole moment of polar and non – polar molecules – dielectric relaxation time   – permittivity of solutions – breakdown – Strength of Glasses – Dielectric properties of liquid mixtures at different temperatures – Dielectric absorption.

UNIT V : Applications

Acoustical grating – sonar – depth of sea – measurement of velocity of blood flow and movement of heart – Ultrasonic imaging – High resolution images – Non destructive testing – Principle – Methods – Liquid penetrant method - - Ultrasonic flaw detector – X- ray Radiography and Fluoroscopy – Thermography - Applications of Ultrasonics in NDT.

BOOKS FOR STUDY AND REFERENCE:

1. Fundamentals of Ultrasonics, J. Blitz, Second Edition,   Plenum Press, New York, (1967).
2. Physical Acoustics, W.P. Mason, (1959).
3. Sonics by P.P. Hueter and R.H. Bolt, Wiley, New York, (1955).
4. Molecular Acoustics, J. Matheson, Wiley, New York, (1971).
5. Ultrasonics: Fundamentals, Technologies and Applications, Third Edition, Dale Ensminger, Leonard J. Bond, CRC Press, (2011).

Question Paper Pattern

Maximum Marks:75 Marks   Exam Duration:3 Hrs

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)

Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)

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RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

LASERS AND APPLICATIONS

Unit 1: FUNDAMENTALS OF LASER:

Lasers – Characteristic properties – Directionality – intensity – monochromaticity Coherence – principles of lasers – absorption – spontaneous emission – stimulated emission – Einstein's theory of stimulated emission – population inversion – methods of achieving population inversion -2,3,4 level pumping schemes – Amplification and gain-Optical resonator and its action- Schawlow and Townes Threshold condition.

Unit 2:OPTICAL PROCESSES THEORY:

Waves and interference – Coherence – Temporal and Spatial Coherence – Coherence of the field and the size of the source- coherence and monochromaticity-Line broadening mechanisms.
Cavity Configuration – Plane Parallel Cavity – Confocal, Hemispherical, Long Radius Cavity – Modes – Longitudinal And Transverse – Single Mode Operations-Properties of Laser modes.

Unit 3:TYPES OF LASERS:

Introduction – Ruby Laser – Three level system-U3+ in CaF2 Laser-A four level system-Nd:YAG laser- Construction and working – He-Ne laser – working principle – energy level diagram – Argon ion laser – Helium cadmium laser – molecular gas laser – CO2 laser – principle – construction and working –Tunable dye Laser.

Unit 4:DYNAMICS OF LASER PROCESSES:

Production of a giant pulse – Q-switching – Mechanical shutter-Electro optical shutter-Shutter using saturable dyes-Peak power emitted-Laser amplifiers-Cavity dumping- Mode locking –Techniques for mode locking- Mode pulling –Hole burning.

Unit 5: APPLICATIONS OF LASERS:

Holography – Optical communications-Interference-Testing of optical systems-NLO-Harmonic generation-Doppler free two photon spectroscopy-isotope separation -Lasers in computers – weapons – medical applications – industrial applications.

List of Books for study:
1.An introduction to lasers,theory and applications-M.N.Avadhanulu,S.Chand &Co.,New Delhi (2001).
2. Laser and Non-linear Optics – B.B.Laud- Tata McGraw Hill Publications.

List of Books for Reference:
1. Lasers and their Applications – Beesley – Taylor and Francis – London. (1972).
2. Lasers principles and applications – J. Wilson, J.F.B. Hawkes – Prentice Hall – (1987).
3. Lasers theory and Applications-K.Thyagarajan,A.K.Ghatak,Cambridge University Press (1981).
4. Engineering Physics-R.K.Gaur & S.L.Gupta (8th edition) Dhanpat Rai Publications,New Delhi.(2001).

Question Paper Pattern

Maximum Marks:75 Marks   **Exam Duration:3 Hrs**
Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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CONTROLLER OF EXAMINATIONS,
RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits	: 4		Code	: S5PHEL2A
Hours/Week	: 6		Medium	: English and Tamil

(For Students admitted from 2018-2019)

BASIC ELECTRONICS

Unit I: DIODES AND RECTIFIERS

Intrinsic and Extrinsic Semi-conductors -P N junction diode –Biasing-V-I characteristics-Rectifiers-Half wave-Full wave and Bridge rectifier - ripple factor - filters - L-section, □-section filters-Zener diode – V-I Characteristics-zener voltage regulated power supply, Photo Diode – characteristics and applications.

Unit II: TRANSISTORS

Bipolar Junction Transistors –construction – Mechanism of amplification – Modes of operation – Alpha & Beta of a Transistor – Current expression – Transistor static characteristics in CB and CE modes – Transistor biasing(voltage divider biasing) – Two port representation of a Transistor – Parameters-Determination of h-parameters.

Unit III: SPECIAL DEVICES

Special semiconductor devices – FET, JFET, MOSFET (Construction and Working) - FET parameters – Comparison between FET and Transistor – SCR, UJT, DIAC and TRIAC characteristics-Application of SCR as relay and UJT as relaxation oscillator.

Unit IV: AMPLIFIERS AND OSCILLATORS

Power amplifier – Class A power amplifier –Class B power amplifier - Push pull – Gain of amplifier with feedback – Effects of negative feedback – Oscillators – Concepts of feedback oscillators – Wein bridge – phase shift - Hartley- Collpitt's oscillators.

Unit V: OPERATIONAL AMPLIFIERS

Operational amplifier– Characteristics – Ideal operational amplifier – Practical operational amplifier – Inverting and non-inverting amplifier – CMRR – offset error voltages and current - output resistance – input offset voltage – differential input resistance – input bias current – slew rate - basic op-amp applications – adder,subtractor,integrator, differentiator – comparator – phase shifter – summing amplifier.

BOOKS FOR STUDY:
1. Principles Of Electronics – V.K. Mehta, S.Chand & Co.- 7th Rev. Edition (2005).
2. Basic Electronics and Linear Circuits –N.Bhargava, D.Kulshreshtha and
3. Gupta,Tata McGraw-Hill Publishing Co.(1983).
4. Linear ICs – D. Roy Choudhury, Sherif, Jain – Wiley Eastern.

BOOKS FOR REFERENCE:
1. Electronic Devices and Circuits – Sarjeer Gupta – Dhaanpat rai Publications – New Delhi – Reprint – 2008.
2. Elements of Solid State Electronics – A. Ambrose and T.Vincent Devaraj – Mera publications -1993.
3. Basic Eelectrical, Electronics and Computer Engineering – R.Muthusubramanian , S. Salivahanan, K.A. Muraleedharan – Tata McGraw Hill publishing Co. Ltd., New Delhi – Reprint (2004)
4. Electronic Devices and Circuits – Jacob Millman, Christos. C. Halkib – Tata McGraw Hill publishing Co., Ltd., New Delhi – Reprint (2002).

Question Paper Pattern

Maximum Marks:75 Marks   **Exam Duration:3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)

Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)

Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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THANJAVUR-613 005.

Credits : 4   Code   : S5PHEL2B
Hours/Week : 6   Medium : English and Tamil

ELECTIVE COURSE
ENERGY PHYSICS

UNIT I : Introduction to Energy Sources

Energy sources – Types of energy sources – World energy futures- Energy sources and their availability – Prospects of renewable energy sources.

UNIT II : Solar Cells

Solar Cells: Solar cells for direct conversion of solar energy to electric powers – Solar cell parameter – Solar cell electrical characteristics – Efficiency – Single crystal silicon solar cells – Polycrystalline silicon solar cells – Cadmium sulphide solar cells.

UNIT III : Applications of Solar Energy

Solar water heating – space heating and space cooling – solar photo voltaics – agricultural and industrial process heat – solar distillation – solar pumping– solar furnace – solar cooking – solar green house.

UNIT IV : Wind Energy

Base principles of wind energy conversion wind data and energy estimation – Base components of wind energy conversion systems (WECS) types of wind machines – Generating systems – scheme for electric generation – generator control – load control–applications of wind energy.

UNIT V : Energy from Biomass

Biomass conversion Technologies – wet and Dry process – Photosynthesis-Biogas Generation: Introduction – basic process and energetic – Advantages of anaerobic digestion – factors affecting bio digestion and generation of gas – Classification of Biogas plants: Continuous and batch type – the done and drum types of Bio gas plants – biogas from wastes fuel – properties of biogas – utilization of biogas.

BOOKS FOR STUDY AND REFERENCE:

1. F. Kreith and J.F. Kreider, Principles of Solar Engineering, Tata McGraw Hill (1978).
2 A.B. Meinel and A.P.Meinel, Applied Solar Energy, Addison Wesley Publishing Co. (1976).
3. M.P.Agarwal, Solar Energy, S. Chand and Co., New Delhi (1983).
4. S.P.Sukhatme, Solar Energy, Tata McGraw Hill (1997).

Question Paper Pattern

Maximum Marks:75 Marks   Exam Duration:3 Hrs

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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THANJAVUR-613 005.

Credits : 4   Code   : S5PHEL2C

Hours/Week : 6   Medium : English and Tamil

ELECTIVE COURSE
MATERIALS SYNTHESIS AND CHARACTERIZATION

UNIT I : Nucleation and Growth

The crystalline state - concept of crystal growth – historical review – Importance   of crystal growth – crystal growth theory : classical theory – Gibbs – Thomson equation- kinetic theory of nucleation – Energy of formation of a nucleus – kinetics of thin film formation – Film growth – five stages – Nucleation theories – Incorporation of defects and impurities in films – Deposition parameters and grain size – structure of thin films.

UNIT II : Growth Techniques

Solution growth technique: Low temperature solution growth: solution –Solubility – constant temperature bath an crystallizer – seed preparation and mounting – slow cooling and solvent evaporation methods.

Gel growth technique: Principle – various types – structure of gel – Importance of gel –Experimental procedure–Advantage of gel method.

Melt technique: Bridgman technique – Czochralski technique – Experimental arrangement – Growth process.

Vapour technique: Physical vapour deposition – chemical vapour deposition (CVD) –chemical vapour transport.

UNIT III : Thin Film Deposition Techniques

Thin films – Introduction to vaccum technology – deposition techniques – physical methods – resistive heating, electron beam gun and laser gun evaporation – sputtering: Reactive sputtering, radio frequency sputtering – chemical methods – spray pyrolysis–preparation of transport conducting oxides.

UNIT IV : Characterization Technique

X-ray Diffraction (XRD) – power and single crystal – Fourier transform infrared analysis – FT-Raman analysis – Elemental dispersive x-ray analysis (EDA–X) – scanning electron microscopy (SEM) – UV –VIS Spectrometer Vickers micro hardness

– Auger emission spectroscopy. Photo luminance (PL) – UV-Vis-IR spectrometer – AFM– Hall effect – SIMS – X-ray – photoemission spectroscopy (XPS) – dynamic light scattering–Ellipsmety method.

UNIT V : Applications

Micro electrochemical systems (MEMS) – optoelectronic devices: LED, LASER and solar cell – polymer films – Fabrication and characterization of thin film transistor, capacitor, resistor, inductor and FET – Sensor – quantum dot – Applications of ferromagnetic and super conducting films: Data storage, Giant magneto resistance (GMR).

BOOKS FOR STUDY AND REFERENCE

1.K. Sangawal, Elementary Crystal Growth, Shan Publisher, UK (1994).

2.P. Santhana Ragavan , P.Ramasamy, Crystal Growth and Processes, KRU Publications, Kumbakonam (2000).

3.J.C.Brice, Crystal Growth Process, John Wiley Publications, New York (1996).

4.L.I. Maissel and R. Clang, Hand book of Thin Films Technology, McGraw Hill (1970).

5.J.L. Vossen and W. Kern, Thin Films Process, Academic Press (1978).

6.M. Ohring, The Materials Science of Thin Films, Academic Press (1992).

7.M. William and D. Steve, Instrumental Methods of Analysis, CBS publishers, New Delhi (1986).

8.H.H. Williard, L.L. Merritt, M.J. Dean, and F.A. Settle, Instrumental Methods of Analysis, Sixth Edition, CBS Publishers and distributors, New Delhi (1986).

9.R.W.Berry, P.M.Hall and M.T.Harris, Thin Film Technology, Van Nostrand, New York (1968).

10. A. Goswami, Thin Film Fundamentals, New Age International (P) Ltd. Publishers, New Delhi (1996).

Question Paper Pattern

Maximum Marks:75 Marks   **Exam Duration:3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)

Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)

Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

HOD Signature
HEAD,
DEPARTMENT OF PHYSICS,
RAJAH SERFOJI GOVT. COLLEGE
THANJAVUR-613 005.

CONTROLLER OF EXAMINATIONS,
RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credit : 2
Hours/week : 1
Medium of Instruction : English / Tamil

CODE : 55SSD

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
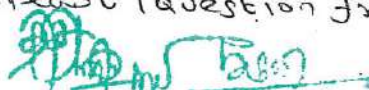(vi)   Principle centred leadership Stephen Covey

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1

Question Pattern

Max marks : 50
Exam hours : 3
Part A : 5 x 4 = 20 (5 out of 7 atleast 1 question from 1 unit)
Part B : 3 x 10 = 30 (3 out of 5 atleast 1 question from 1 unit)

Credits: 2   Code: S5SB3J

<div align="center">

Skill Based Elective III (Semester V)

MOBILE SERVICING

</div>

Objectives

- To understand the fundamentals of cell phone
- To learn the chip level study and trouble shooting
- To acquire the practical knowledge.

Unit I : Fundamentals of CELL phone

Introduction to GSM/CDMA - Concepts of GSM/CDMA Cellular Technologies - Working of GSM - Information of Cell Sites & Base Station - Call Processing of a GSM - GPRS - Mobile Softwares (PC suite)

Unit II : Chip level study

I Chip Level Information of Mobile Phones (Tools & Components) - BGA - SMD - Air Gun - Soldering Station - Rework Station - Soldering lead -Soldering paste - De-Soldering wire - Identification of IC's - Assembling & Disassembling of mobile phones.

Unit III : Trouble shooting

Causes for various problems & Troubleshooting of Problems in a Mobile Phone - Network Problems - Display Problems - Sim Card Problems – Charging problems - Battery Problems - Software Unlocking - Software Flashing -IMEI information - Downloads of logos & Ring tones - Problems related to mobile phone hand sets - replacement of Various components ICS.

Unit IV : Practical 1

Disassembling the cell phone - Battery problems - display - Antenna problems-Network problems - Sim Card problems - SMD soldering.

Unit V : Practical 2

Software Unlocking - Software flashing - Downloads of logos – Downloads of Ring tones - Hand set problems - Replacement of modules (display, mic, speaker, antenna, amplifier, etc.).

Text book

1. William L. Armstrong, Learn Cell Phone Repair, kindle edition, 2013
2. Pandit Sanjib, Advance Mobile Repairing: Multicolour Circuits, Service Diagrams & Repairing, BPB publications.2010.

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Question Pattern

Max. marks: 50.   Exam. Duration: 3 hrs.

Part-A   5×4 = 20   (5 out of 7 atleast 1 Question
                                        from each unit)

Part-B   3×10 =30 (3 out of 5 atleast 1 Question
                                        from each unit)

Credits : 4   Code: S5PHELO1
Hours/Week : 4   Medium : English and Tamil

(For students admitted from 2018-2019)
DOMESTIC ELECTRICAL APPLIANCES
(For III Yr B.Sc., Chemistry Students)

Unit 1: FUNDAMENTALS OF ELECTRICITY

Electricity – Charge-Electric current –Direction of flow of current-Pressure-ResistanceLaws of conservation of energy-Effects of electricity-Ohms law-Kirchhoffs law.

Unit 2: ELECTRIC COMPONENTS AND MEASURING INSTRUMENTS

Conductor - Insulator - Resistor -Capacitor -Transformers - Step up and Step down transformers - Galvanometer -Ammeter - Voltmeter - Ohm meter - AVO meter (multimeter) - Watt - Watt hour meter - Commercial electrical billing(problem)-Line tester-Test lamp.

Unit 3: LIGHTING AND HEATING APPLIANCES

Design and working of Incandescent lamp - Fluorescent lamp - Electric iron - Electric hot plate - Room Heater - Immersion heater-Geyser-CFL,LED lamps.

Unit 4: MODERN ELECTRICAL APPLIANCES

Design and working of Water motors and its types - Fan - Refrigerator - Air Conditioning - Wet grinder - Microwave oven - Remote control-Hair drier-Electric bell,Cordless phoneVacuum cleaner.

Unit 5: SAFETY MEASURES AND STAND BY DEVICES

Switch and its types - Fuse – Standard Wire Gauge - Miniature circuit breaker (MCB) - Ground – Uninterrupted Power Supply - Inverter. Electric shock and its effects -Symptoms and first aid - Safety tips - Home repair safety tips - Tips for conserving electricity-RelayThermostat-Voltage regulator-Generator.

LIST OF BOOKS FOR STUDY:

1. Basic Electrical Engineering - M.L.Anwani & I.Anwani Dhanpat Rai and Co. New Delhi (2012).
2. Domestic Electric Appliances - General Interest book from market shelf.
3. Electrical Appliances –Complete Guide to the maintenance and repair of Domestic Electrical Appliances- Graham Dixon.
4. Domestic Electrical Appliances-Thomas Anthony Buchanan Corley-Cape,(1996)
5. Domestic Electrical Appliances (Motor type)-Ministry of Commerce & Industry-Govt.of India.

REFERENCES:

1. http://www.howstuffworks.com.
2. http://www.answers.com
3. http://www.wikipedia.org

Question Paper Pattern

Maximum Marks: 75 Marks   Exam Duration: 3 Hrs

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (One Questions from each unit)

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THANJAVUR-613 005.

CONTROLLER OF EXAMINATIONS,
RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits : 4   Code : S6PH6
Hours/Week : 6   Medium : English and Tamil
                        (For students admitted from 2018-2019)
                    WAVE MECHANICS AND NUCLEAR PHYSICS

Unit 1: DUAL NATURE OF MATTER:

Dual nature of light –De' Broglie's concept of matter waves – De' Broglie wavelength – Wave and group velocity – Relation between wave and group velocity – Davisson and Germer experiment – G.P. Thompson experiments – Heisenberg's Uncertainty Principle.

Unit 2 : WAVE MECHANICS:

Basic Postulates of wave mechanics – Quantum operators, Linear operator, Hermitian operator, Parity operators – Properties of wave Function – Orthogonal and normalized wave functions – Eigen Values and Eigen Functions – Schrodinger's Equations – Time Independent – Time Dependent – Application – Particle in a box-Rigid rotator.

Unit 3: STRUCTURE OF THE NUCLEUS:

Classification of Nuclei – General Properties of Nucleus – Size, Mass, Density Charge, Angular momentum and Dipole moments – Binding Energy – Packing fraction – Nuclear stability – Semi Empirical Mass formula – Liquid Drop Model – Shell Model.

Unit 4: PARTICLE DETECTORS:

Radioactivity – Properties of Alpha, Beta and Gamma Rays – Geiger-Nuttal Law – Nuclear Isomerism – Soddy Fajan's displacement law – Radioactive disintegration Law – Half Life, Mean Life periods – Law of Successive disintegration-Linear Accelerator - Cyclotron-Betatron.

Unit 5: NUCLEAR REACTIONS:

Types of Nuclear Reaction – Energy balance – Q value – Transmutation by Alpha, Proton, Deutrons and Neutrons – Artificial Radioactivity – Radio Isotopes – Applications – Nuclear Fission – Chain reaction – Nuclear Reactor –Fast Breeder reactor- Nuclear Fusion – Thermo Nuclear Reactions – Carbon-Nitrogen Cycle – Proton-Proton Cycle

BOOKS FOR STUDY:

1. Modern Physics by R.Murugesan S.Chand & Co New Delhi 1995.
2. Modern Physics by M.A. Thangaraj & N. Anandha Krishnan.
3. Modern Physics by J.B. Rajam, S. Chand & Co New Delhi 1980.

Question Paper Pattern
Maximum Marks:75 Marks   **Exam Duration:3 Hrs**
Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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THANJAVUR-613 005.

Credits : 4
Code : S6PHP6
Hours/Week : 3
Medium : English and Tamil
Semester : 6

(For students admitted from **2018**)

MAJOR PRACTICAL – VI

(Choose any **Fourteen** Experiments)

1. Young's Modulus-Koenig's method (Uniform Bending).

2. Spectrometer – Small Angled Prism.

3. Spectrometer – Hartmann's formula..

4. B.G. – Comparison of Capacitances (C_1/C_2).

5. B.G. – Comparison of Mutual Inductances (M_1/M_2).

6. Potentiometer – EMF of a given Thermocople.

7. Emitter Follower.

8. Colpitt's Oscillator - Frequency and Self-inductance (L).

9. Operational Amplifier – Differentiator and Integrator.

10. Operational Amplifier-Low pass filters.

11. Operational Amplifier- Monostable Multivibrator.

12. Half Subtractor , Full Subtractor using basic logic gates (Ic).

13. Simplification of Boolean Theorems.

14. Simplification of Boolean Expressions by Karnaugh map.

15. Shift Register using IC.

16. Study of Flip Flops.

17. Microprocessor- 16-Bit Addition.

18. Microprocessor – Decimal to Octal Conversion.

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THANJAVUR-613 005.

Credits : 4   Code   : S6PH7
Hours/Week : 7   Medium : English and Tamil

(For students admitted from 2018-2019)

DIGITAL ELECTRONICS

UNIT I : NUMBER SYSTEM AND CODES

Number System: Binary, Decimal, Octal and Hexadecimal numbers and Conversion - Floating point representation of numbers - Arithmetic Operations – 1's and 2's complements; Binary Coded Decimal (BCD) - Codes: Weighted codes and Non-weighted codes - Error detecting codes; Error correcting codes; Alphanumeric Codes.

UNIT II : BOOLEAN ALGEBRA AND LOGIC GATES

Boolean Algebra: Boolean logic operations - Basic laws of Boolean algebra – DeMorgan's theorem; Sum of Products and Product of Sums; Karnaugh map -three and four variable K-map. Logic Gates: OR, AND, NOT and EX-OR gates, NAND and NOR as universal gates.

UNIT III : ARITHMETIC AND COMBINATIONAL CIRCUITS

Arithmetic : Half adder - Full adder - Half Subtractor - Full Subtractor - Parallel binary adder - 4 bit binary adder and Subtractor - BCD adder - Combinational Circuits: Multiplexer – Demultiplexer –Decoders - Encoders Parity generators / checkers - Binary-to-Gray code converter - Gray-to-Binary code converter - Magnitude comparator

UNIT IV : SEQUENTIAL LOGIC CIRCUITS

Flip-Flops: S-R Flip-flop - Clocked S-R Flip-flop - D Flip-flop and T Flip-flop - J-K Flip-flop - Master-slave Flip-flops - Applications of Flip-flops - Counters: Asynchronous / Ripple counter - Up-down counter - Synchronous counter - Design of Synchronous MOD-N counters - Registers: Left Shift Registers &Right shift register .

UNIT V: 555 -TIMER AND CONVERTERS

555 Timer pin configuration – 555 Timers as Schmitt trigger-555 timer as monostable multivibrator-monostable Theory. Binary Weighted D/A Converter – Resolution – accuracy –R-2R resistive ladder D/A converter-Analog to digital converter- counter type ADC – successive approximation A/D converter.

Text Books:

1. S. Salivahanan, S. Arivazhagan, Digital Electronics, Vikas Publishing House, 2010.
2. Anil. K. Maini, Digital Electronics, Wiley Publications, 2008.
3. D.Roy Choudhury and Shahil B Jain, Linear Integrated Circuits, New Age International Publishers, 2004.

Reference Books:

1. A. Anand Kumar, Fundamentals of Digital Circuits, PHI, 2003
2. K.R. Botkar, Integrated Circuits, Khanna Publishers, 2004
3. Operational Amplifier – Chowdhry.

Question Paper Pattern

Maximum Marks:75 Marks   Exam Duration:3 Hrs

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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RAJAH SERFOJI GOVT. COLLEGE (AUTONOMOUS)
THANJAVUR-613 005.

Credits   : 4   Code   : S6PHEL3A
Hours/Week   : 7   Medium   : English and Tamil

(For Students admitted from 2018-2019)
MICROPROCESSOR AND C PROGRAMMING

Unit I: BASICS OF DIGITAL COMPUTER

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

Unit II: INTEL 8085 AND ITS ARCHITECTURE

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

Unit III: ASSEMBLY LANGUAGE PROGRAMMING

Addition - Subtraction - Multiplication -Division of two 8- bit numbers —Finding the largest or smallest number in a data array-Arranging a list of numbers in ascending or descending order-Addition of 16-bit numbers - complement -shift-mask-look up table- multi byte addition and subtraction —decimal addition - subtraction.

Unit IV: INTRODUCTION TO C

Fundamentals of C —Basic structure of C program – Character set – C tokens- Keywords and identifiers –Ccnstants – Variables-Data types- – Declarations and assigning values to the variables – Symbolic constants-Operators and Expressions – Arithmetic Operators-Relational, Logical, Assignment and Conditional operators-Increment and Decrement operators – Bitwise and special operators – Library function.

Unit V: PRELIMINARIES AND FUNCTIONS

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

Basic functions – Return values and their types- Calling functions – storage class - automatic variables - External Variables - Static Variables - Recursion.

BOOKS FOR STUDY:

1. B.Ram.Fundamentals of Microprocessors and Microcomputers.Dhanpat Rai publication pr. Ltd., New Delhi.
2. Programming in C -E. Balagurusamy – Tata McGraw Hill Pub. Co.(2008).

BOOKS FOR REFERENCES:

1. Ramesh. S.Goankar, Microprocessor Architecture, Programming and Applications with the 8085,Penram International Publishing (India) Pvt.Ltd.(2002).
2. Programming with C - Venugopal, K.R. And Sudep, R.P.- Tata McGraw Hill Pub. Co. Ltd.

Question Paper Pattern

Maximum Marks: 75 Marks   **Exam Duration: 3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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THANJAVUR-613 005.

Credits : 4   Code   : S6PHEL3B
Hours/Week : 6   Medium : English and Tamil

ELECTIVE COURSE - X-RAY CRYSTALLOGRAPHY AND BIOPHYSICS

UNIT I: X-ray and crystals

Origin of X-rays – conventional generators-construction and geometry sealed tube- rotating anode generator-choice of radiation-Synchrotron radiation - Lattice planes-Miller indices - X-ray diffraction - Crystal systems and symmetry – unit cell – space lattices- non primitive lattices – point groups–space groups – analysis of space group symbols - Crystallization – growing crystals – choosing a crystals – crystal mounting-alignment–measurement of crystal properties.

Data collection techniques for single crystals: Laue method- single crystal diffraction cameras: rotation and Oscillation method – Ewald construction - Single crystal diffractometers: Instrument geometry-crystal in a diffracting position – Data collection strategy: determination of unit cell – orientation matrix - Intensity Data collection - Unique data –equivalent reflections–selection of data.

UNIT II: Data Reduction

Integration of intensity - Lorenz and Polarization corrections – absorption –deterioration or radiation damage – scaling–Interpretation of Intensity.

Structure factors and Fourier syntheses: Structure factor –Friedel's Law – exponential and vector form – generalized structure factor – Fourier synthesis –Fast Fourier transform – Anomalous scattering and its effects. Calculation of structure factors and Fourier syntheses.

UNIT III: Phase Problem

Methods of solving Phase Problem: Direct methods – Patterson methods –Heavy atom methods. Refinement of crystal structures: Weighting – Refinement by Fourier syntheses – Locating Hydrogen atoms identification of atom types – least squares – goodness of fit –least square and matrices-correlation coefficients – Relationship between Fourier and Least squares – Practical consideration in least squares methods – Random and systematic errors– Molecular geometry – absolute configuration – thermal motion.

UNIT IV: Cell organelles and molecules

Basic structure of prokaryotic and eukaryotic cells – mitochondiria and the generation of ATP – Chemical composition of living systems – molecular components of cell – chemical structure of carbohydrate–Lipids-proteins– Nucleic acids–hetro macro molecules.

Molecular interactions: Molecular forces – forces hold macro molecules together–intermolecular weak forces – van der waals – inductive force – dispersion force – Lenard-Jones potential – hydrogen bond – hydrophobic forces – acid, bases and pH, pK, pI and buffering.

UNIT V: Macromolecular Structure

Nucleic acid structure – conformation of monomers and polymers – double helical structure of DNA – polymorphism of DNA – DNA super coiling – structure of transfer RNA. Protein structure – amino acids – primary structure – peptide bond – secondary structure–α-helix and β- sheet–tertiary and quaternary structure–Virus structure.

BOOKS FOR STUDY AND REFERENCE:

1. X-ray Structure Determination, Second Edition, Stout and Jensen, John Wiley Publications.
2. Fundamentals of Crystallography, Second Edition, C. Giacovazzo, Oxford Press.
3. Structure Determination by X-ray Crystallography, Second Edition, Ladd and Palmer.
4. Molecular Biophysics, Structure in motion, M. Duane, Oxford University Press.
5. Introduction to Molecular Biophysics, J.A. Tuszynski and M.Kurzynsk, CRC Press.
6. Principles of Physical Biochemistry, K.E. Van Holde, N.C. John and P.S. Ho, Prentice Hall Publications.
7. Biophysics, M.V. Volkenshtein, Mir Publications, Moscow.
8. Practical Protein Crystallography, Duncan E. McRee, Academic Press Publications.
9. Elements of X-ray crystallography, Leonid V. Azaroff, McGraw Hill Publications.
10. Biophysics An Introduction, Rodney M.J. Cotterill, John Wiley Publication.
11. Biophysics, Vasantha Pattabhi and N.Gautham, Narosa Publishing House.
12. Biophysics, Roland Glace, Springer Publications.
13. Elementary Biophysics: An Introduction, P. K. Srivastava, Narosa Publishing House.

Question Paper Pattern

Maximum Marks: 75 Marks   Exam Duration: 3 Hrs

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)

Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)

Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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THANJAVUR-613 005.

Credits : 4	Code : S6PHEL3C
Hours/Week : 6	Medium : English and Tamil

PRINCIPLES OF COMMUNICATION SYSTEMS

UNIT I WAVE PROPAGATION

EM waves – Free space propagation – Surface wave propagation – sky wave propagation – space wave propagation – Trophospheric scatter propagation – Structure of Atmosphere – Virtual height – MUF – Lowest Usable Frequency – Skip Distance – Optimum Working Frequency – Ionospheric abnormalitiesduct Propagation.

UNIT II ANTENNAS

Electromagnetic radiations – Elementary doublet – Current and Voltage Distribution – Resonant antennas, radiation patterns and length calculations – Non resonant antennas – Antenna gain and Effective radiated power – Antenna resistance – Bandwidth, Beam width and Polarization –

Grounded and Ungrounded antennas – Effects of height – Feed point – Couplers – Impedance matching – Dipole Arrays - Yagi Uda antenna – Parabolic antenna – Horn and Lens antenna – Helical antenna - Transmission line – Cable types – Co- axial and wire- pair – Maximum power transfer.

UNIT III MODULATION TECHINIQUES

Introduction to Communication Systems – Information – Transmitter – Channel – Noise – Receiver – Need for Modulation Band width requirement – Amplitude modulation: AM Theory – frequency spectrum of AM wave –Representation of AM – Power relations in AM wave – AM Transmitter block diagram – Frequency modulation – System description – Mathematical

representation – Frequency Spectrum – Generation of FM – Direct and Indirect methods.

UNIT IV SINGLE SIDEBAND MODULATION

Introduction – Principles – Balanced modulator – SSB Generation: Filter method, Phase shift method and Third method – SSB Reception: Pilot Carrier SSB and Independent Side band – vestigial sideband transmission – Introduction to PAM, PWM, PPM and PCM.

UNIT V COMMUNICATION SYSTEMS

Introduction – Super heterodyne Receiver – Choice of IF and Oscillator Frequencies – Image Rejection – Adjacent Channel Selectivity – spurious response - Tracking – AGC – Double conversion receiver - RADAR principle – 12 Satellite communication fundamentals – Up Link – Down Link – Transponder – Multiplexing technique – Basics of mobile communication.

Text Books:

1. Kennedy and Davis, Electronic Communication Systems, Tata McGraw Hill, 8th Edition, 1999
2. Dennis Roddy and John Coolen, Electronic Communications, PHI, 4th edition, 1995
3. K.D. Prasad, Antenna & Wave Propagation, Satya Prakashan, 2012.

Reference Books:

1. Anok singh & A.K. Chhabra, Principles of Communication Engineering,S.Chand & Company Ltd, 6th Edition, 2007.
2. NIIT, Basics of Electronic Communication, Prentice Hall India Pvt. Ltd,2004.

Question Paper Pattern

Maximum Marks: 75 Marks   **Exam Duration: 3 Hrs**

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

HOD Signature

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.

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QP Pattern   3   Exam hours : 3

Part A : 5 x 4 = 20 (5 out of 7 1 Question from @unit)

Part B : 3 x 10 = 30 (3 out of 5 1 Question from each unit)

Credits : 4   Code   : S6PHELO2
Hours/Week : 7   Medium : English and Tamil
(For students admitted from 2018-2019)
BIO – INSTRUMENTATION
(For III Yr B.Sc., Zoology Students)

Unit-I Physiology and Bioelectric Signals

Human physiology-cardiovascular system- nervous system- muscular-skeletal system- respiratory system –Origin of bioelectric signals and its various sources – biometrics - Basic biomedical Instrumentation system and performance requirements -Half cell potential – pacemakers- Electrode- tissue interface.

Unit-II Transducers and Biosignal measurements

Bipolar and unipolar electrodes - Types of electrodes - micro, needle and surface electrodes - Resistive transducers - Inductive Transducers - capacitive Transucers - photoelectric Transducers - piezoelectric Transducers - Bioelectric signals ECG – EEG – EMG – ERG – Lead systems and recording methods.

Unit-III Biological parameters measurement

Measurement of blood pressure – Cardiac output – Heart rate – Heart sound –Pulmonary function measurements – spirometer – Photo Plethysmography, Body Plethysmography – Blood Gas analysers : pH of blood –measurement of blood pCO_2, pO_2, finger-tip oxymeter - ESR, GSR measurements.

Unit-IV Clinical Instruments

Calorimeter –spectral photometer- flame photometer- auto analyzer- blood cell counter-Nerve stimulator- Electro surgical unit- Thermography- Diathermy- Heart lung machine- Haemo Dialyser unit-lithotripsy-Laparoscopy-Oximeter- principles of cryogenic technique and application.

Unit- V Medical Imaging

Radio graphic and fluoroscopic techniques – Computer tomography – MRI – Ultrasonography – Endoscopy – Thermography – Different types of biotelemetry systems and patient monitoring –Introduction to Biometric systems.

TEXT BOOKS

1. R.S.Khandpur, 'Hand Book of Bio-Medical instrumentation', Tata McGraw Hill
   Publishing Co Ltd.,2003.

2.Leslie Cromwell, Fred J.Weibell, Erich A.Pfeiffer, 'Bio-Medical Instrumentation
   and Measurements', II edition, Pearson Education, 2002 / PHI.

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2. L.A. Geddes and L.E.Baker, 'Principles of Applied Bio-Medical
   Instrumentation', John Wiley &Sons, 1975.

3. J.Webster, 'Medical Instrumentation', John Wiley & Sons, 1995.

4. C.Rajarao and S.K. Guha, 'Principles of Medical Electronics and Bio-medical
   Instrumentation', Universities press (India) Ltd, Orient Longman ltd, 2000.

Question Paper Pattern

Maximum Marks: 75 Marks   Exam Duration: 3 Hrs

Part - A 10 X2 = 20 Marks Answer ALL Questions (Two questions from each unit)
Part - B 5 X5 = 25 Marks Answer ALL Questions (Either or Type - Two questions from each unit)
Part – C 3 X10=30 Marks Answer Any Three Questions (Three out of Five – One question from each unit)

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