
VIVEKANANDA COLLEGE

College with Potential for Excellence

Residential & Autonomous – A Gurukula Institute of Life-Training Re-accredited (3rd Cycle) with 'A' Grade (CGPA 3.59 out of 4.00) by NAAC

Affiliated to Madurai Kamaraj University

(Managed by Sri Ramakrishna Tapovanam, Tirupparaiturai, Trichy)

TIRUVEDAKAM WEST, MADURAI DISTRICT- 625 234

www.vivekanandacollege.ac.in



Department of Physics

Programme: B.Sc Physics

**Choice Based Credit System (CBCS)
and
Learning Outcomes based Curriculum Framework
(LOCF)**

(For those students admitted during the Academic Year 2021-2022 and after)

DEPARTMENT OF PHYSICS

Programme: B.Sc. Physics

Vision

- ❖ Inculcating the basic and up to date knowledge in physical science to the first generation students from rural areas – by student centered learning methods and a mixture of traditional, current, and integrative pedagogical techniques
- ❖ The department has dedicated itself for a lifelong learning through academic and social programs

Mission

- ❖ Prepare the student in assets of physics and the principles of analytical methods required for the competitive physics tests in the competitive world
- ❖ Kindle the knowledge of students to pursue higher studies and research programs. Making the students self employable with the Physics knowledge gained during their degree course of study
- ❖ To provide the tools and skills for advancing our knowledge about the universe and for providing solutions to challenges we face as individuals, communities, and societies

About the Programme

The programme of Physics was established in the year 1973. Under the able guidance of the dedicated faculty, the students of the department have shown remarkable achievements in curricular and co-curricular activities. The department arranges guest lectures, workshops and National level seminars to promote a scientific attitude among the students and young teachers which will motivate them to take up research.

The Bachelor of Science Degree in Physics is designed to produce graduates who excel in the competencies and values required for leadership to serve a rapidly evolving global community. The curriculum will enhance the student's academic abilities, personal qualities and transferable skills which will give them an opportunity to develop as responsible citizens. On completion of the course the students will be able to, Understanding the concepts and significance of the various physical phenomena, carry out experiments to Understanding the laws and concepts of Physics and Applying the theories learnt and the skills acquired to solve real time problems.

Programme Educational Objectives (PEOs)

A Graduate of B.Sc. Physics programme after three years will be

PEO1	Utilizing the physics concepts in the day to day life for better living. Applying the physics theories in the work places and homes to make better decision and choice.
PEO2	Succeed in obtaining employment appropriate to their interests, education and will become a valuable physicist
PEO3	Develop technical skills for experiments for pursue a career in physics and related areas.
PEO4	Continue to develop professionally through life-long learning, higher education, research and other creative pursuits in their areas of specialization.
PEO5	Improve leadership qualities in a technical and social response through innovative manner.

Programme Learning Outcomes (PLOs)

On completion (after three years) of B.Sc. Physics programme, the students are expected to

P.No.	Programme Outcome	Description
PLO1	Disciplinary Knowledge and Critical Thinking	Take informed actions after identifying the assumptions that frame our thinking and actions, checking out degree to which these assumptions are accurate and valid, and looking at our ideas and decisions (intellectual, organizational, and personal) from perspectives.
PLO2	Effective Communication and Digital Literacy	Speak, read, write and listen clearly in person and through electronic media in English and in one Indian language, and make meaning of the world by connecting people, ideas, books, media and technology.
PLO3	Social Interaction and Problem Solving	Elicit views of others, mediate disagreements and help reach conclusions in group settings.
PLO4	Effective Citizenship and Social Responsibility	Demonstrate empathetic social concern and equity centred national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering and life training.
PLO5	Professional Ethics and Human Values	Recognize different value systems including your own, understand the moral dimensions of your decisions, and accept responsibility for them.
PLO6	Environment and Sustainability	Understand the issues of Environmental contexts and Sustainable development.
PLO7	Self-directed and life-long learning	Acquire the ability to engage in independent and life-long learning in the broadest context socio- technological changes

Programme Specific Outcomes (PSOs)

At the end of the programme the student will

PSO1	Gain a wide spectrum of skills which will enable them to solve both theoretical and experimental problems involving physics principles
PSO2	Acquire knowledge on the physics concepts and laws utilized in related fields
PSO3	Analyze problems in physics by identifying the underlying principles to solve them.
PSO4	Develop the skill to understand the physical properties of materials and latest developments in the fields of physics.
PSO5	Be able to make effective use of ICT tools and secure jobs in the field of Education, and in industries which require scientific knowledge.

Graduate Attributes (GA)

	Attributes	Description	Part
GA 1	Modern Tool Usage	Application of appropriate techniques, resources and modern tools to complex activities with an Understanding of the limitations	Hand
GA 2	Environment and Sustainability	Understanding the impact of solutions in societal and environmental contexts for sustainable development	Hand
GA 3	Technical and Entrepreneurial Skills	Creating confidence to become an entrepreneur by providing entrepreneurial and technical skills	Hand
GA 4	Capacity	Ability to face the realities of life and withstand current challenges	Hand

GA 5	Graduate and Society	Application of reasoning to assess social health, safety, legal and cultural issues and the consequent responsibilities relevant to the social practice	Heart
GA 6	Ethics and Values	Application of ethical principles, professional ethics, responsibilities and norms of the life through value oriented life training	Heart
GA 7	Creativity	Demonstration of knowledge, Understanding of management principles and application of these to one's own work to manage projects and in multidisciplinary environments	Heart
GA 8	Harmonious Development of Individual	Making an individual as perfect man through the harmonious development of physical, emotional and intellectual cultures	Heart
GA 9	Adaptability	Accepting the ground realities and adapt to the situation to overcome frustrations and failures.	Heart
GA 10	Knowledge	Application of knowledge of the respective discipline to the solution of complex problems in the day-to-day life	Head
GA 11	Critical Thinking	Analysis of problems to reach substantiated conclusion by using the principles of mathematics, natural and social sciences and by using research-based knowledge and research methods	Head
GA 12	Problem Solving	Designing of solution for complex problems that meet the specified needs with appropriate consideration as to public health and safety, cultural and societal environment	Head
GA 13	Leadership Quality	Functioning effectively as an individual, as a member or a leader in diverse teams and in multidisciplinary settings	Head
GA 14	Communication	Communication with society at large, such as, effective reporting, documentation designing, effective presentations and clear instructions	Head
GA 15	Life-long learning	Recognizing the need for independent and life-long learning in the context of technological changes	Head

Under Graduate Programmes - Question Paper Pattern for Both CIA & End Semester Examinations**With Effect From: 2018-19 onwards****Part I (Tamil / Sanskrit/Hindi) and Part II**

OBE Syllabus UG: Section A – Remembering (K1)
 Section B – Remembering (K1)
 Section C – Understanding (K2)
 Section D – Applying (K3)

CIA Test Question Paper Pattern (UG) – 3 Tests per Semester – 2 Hours

Section - A: MCQs (Compulsory)	10 X 1 =10 Marks
Section - B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (3 out of 5)	3 X 6 = 18 Marks
Section - D: LA (1 out of 2)	1 X 12 =12 Marks

Total **50 Marks**

End Semester Examinations Question Paper Pattern (UG) – 3 Hours

Section - A: MCQs	10 X 1 =10 Marks (From Question Bank given by the Course Teacher)
Section - B: VSA (5 out of 7)	5 X 2 =10 Marks
Section - C: SA (Either-or)	5 X 5 = 25 Marks
Section - D: LA (3 out of 5)	3 X 10 =30 Marks

Total **75 Marks**

Part III (Core, Allied & Elective)**CIA Test Question Paper Pattern (UG) – 3 Tests per Semester – 2 Hours**

Section - A: MCQs (Compulsory)	10 X 1 =10 Marks
Section - B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (3 out of 5)	3 X 6 = 18 Marks
Section - D: LA (1 out of 2)	1 X 12 =12 Marks

Total **50 Marks**

End Semester Examinations Question Paper Pattern (UG) – 3 Hours

Section - A: MCQs	10 X 1 =10 Marks (From Question Bank given by the Course Teacher)
Section - B: VSA (5 out of 7)	5 X 2 =10 Marks
Section - C: SA (Either-or)	5 X 5 = 25 Marks
Section - D: LA (3 out of 5)	3 X 10 =30 Marks

Total **75 Marks**

Part IV (SBS-Skills Based Subjects)

CIA Test Question Paper Pattern (UG) – 3 Tests per Semester at Department Level– 1 Hour

Section - A: MCQs	5 X 1 = 5Marks
Section - B: VSA (2 out of 4)	2 X 2 = 4 Marks
Section - C: SA (1 out of 2)	1 X 6 = 6 Marks
Section - D: LA (1 out of 2)	1 X 10=10 Marks

Total **25 Marks**

For competitive exam questions Pattern (OMR with 4 options will be used) 50X1=50 (1 hour)

End Semester Examinations Question Paper Pattern (UG) – 2 Hours

Section - A: MCQs	10 X 1 = 10 Marks (From Question Bank given by the Course Teacher)
Section - B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (Either-or)	3 X 9 = 27 Marks
Section - D: LA (2 out of 4)	2 X 14= 28 Marks

Total **75 Marks**

For competitive exam questions Pattern (OMR with 4 options will be used) 75X1=75 (2 hours)

Part IV (Non Major Elective, Value Education and Environmental Studies)

CIA Test Question Paper Pattern (UG) – 1 Test per Semester – 2 Hours

Section - A: MCQs	10 X 1 = 10 Marks
Section -B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (3 out of 5)	3 X 6 = 18 Marks
Section - D: LA (1 out of 2)	1 X 12= 12 Marks

Total **50 Marks**

End Semester Examinations Question Paper Pattern (UG) – 2 Hours

Section - A: MCQs	10 X 1 = 10 Marks (From Question Bank given by the Course Teacher)
Section - B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (Either-or)	3 X 9 = 27 Marks
Section - D: LA (2 out of 4)	2 X 14= 28 Marks

Total **75 Marks**

Part V (End Semester Examinations only)

EXTENSION ACTIVITIES

End Semester Examinations Question Paper Pattern (UG) – 2 Hours

Section - A: MCQs	10 X 1 = 10 Marks
Section - B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (Either-or)	3 X 9 = 27 Marks
Section - D: LA (2 out of 4)	2 X 14= 28 Marks

Total **75 Marks**

Part VI (End Semester Examinations only) UG & PG

1. General Knowledge – (One Examination per Semester– UG & PG) – 1 Hour

Section – A: MCOs

50 X 1 =50 Marks (**OMR Sheet**)

Total

50 Marks

2. Wit for Wisdom and Humour for Health – (One Examination per Year – UG & PG) – 1 Hour

Section – A: LA (5 out of 7)

5 X 20= 100 Marks

Total

100 Marks

3. Spiritual Education– (One Examination per Year – UG & PG) – 1 Hour

Section – A: VSA

20 X 2= 40 Marks

Section – B: SA (3 out of 5)

3 X 5 = 15 Marks

Section –C: LA (2 out of 4)

2 X 10 =20 Marks

Total

75 Marks

4. Physical Training– (One Examination for III Year UG & II Year PG Students) – 1 Hour

Section - A: MCQs

10 X 1 = 10 Marks

Section – B: SA ((Either-or))

4 X 5 = 20 Marks

Section – C: LA (2 out of 4)

2 X 10 =20 Marks

Total

50 Marks

Continuous Internal Assessment (CIA) - Distribution of Marks

	UG		PG	
Part - I, II Part - III	Test (Best Two)	15 Marks	Test (Best Two)	15 Marks
	Cycle Test (5 × 1 = 5)	5 Marks	Quiz / Seminar	5 Marks
	Assignment (5 × 1 = 5)	5 Marks	Assignment	5 Marks
	Total	25 Marks	Total	25 Marks
Part- IV	Test (Best Two for SBS)	20 Marks		
	Assignment	5 Marks		
	Total	25 Marks		

Abbreviations:

MCOs: Multiple Choice Questions

SA : Short Answer

VSA: Very Short Answer

LA : Long Answer

DEPARTMENT OF PHYSICS
SCHEME OF EXAMINATIONS

Programme: B.Sc. Physics (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

FIRST SEMESTER

Part	Study Component	Course Code	Course Title	Hours	Credit	CIA Marks	ESE Marks	Total Marks
I	Tamil	P1LT11	Kavithai Ilakkiyaamum Kathai Ilakkiyamum	6	3	25	75	100
	Sanskrit	P1LS11	Fundamental grammar and History of Sanskrit Literature –I					
II	English	P2LE11	English for Basic Communication Skills	6	3	25	75	100
III	Core	06CT11	Mechanics	4	4	25	75	100
	Core	06CT12	Electromagnetism	4	4	25	75	100
	Core	06CP23	Major Practical	2	-	-	-	-
	AEC	07AEP1	Allied Paper I : Chemistry for Physicist – I	4	4	25	75	100
	AEC	07APP3	Volumetric Estimation	2	-	-	-	-
IV	GEC	06GE11	Space Science	2	2	25	75	100
			TOTAL	30	20			
IV	GEC	NCGE11	Armed Forces and National Integration	2	2	25	75	100

SECOND SEMESTER

Part	Study Component	Course Code	Course Title	Hours	Credit	CIA Marks	ESE Marks	Total Marks
I	Tamil	P1LT21	Idaikkala Ilakkiyamum Nadaga Ilakkiyamum	6	3	25	75	100
	Sanskrit	P1LS21	Poetry, Grammar & History of Sanskrit Literature – II					
II	English	P2LE21	English for Advanced Communication Skills	6	3	25	75	100
III	Core	06CT21	Thermodynamics and Statistical Mechanics	4	4	25	75	100
	Core	06CT22	Optics and Sound	4	4	25	75	100
	Core	06CP23	Major Practical –I	2	2	40	60	100
	AEC	07AEP2	Chemistry for Physicist – II	4	4	25	75	100
	AEC	07APP3	Volumetric Estimation	2	2	40	60	100
IV	GEC	06GE21	Electrical Home Appliances	2	2	25	75	100
			TOTAL	30	24			
IV	GEC	NCGE21	Civil Defence and Adventure Training	2	2	25	75	100

THIRD SEMESTER

Part	Study Component	Course Code	Course Title	Hours	Credit	CIA Marks	ESE Marks	Total Marks
I	Tamil	P1LT31	Kappiya Ilakkiyamum Urainadai Ilakkiyamum	6	3	25	75	100
	Sanskrit	P1LS31	Prose, poetics and History of Sanskrit Literature –III					
II	English	P2LE31	English for Academic Excellence and Success	6	3	25	75	100
III	Core	06CT31	Principles of Electric Circuits	4	4	25	75	100
	Core	06CT32	Spectroscopy	4	4	25	75	100
	Core	06CP43	Major Practical	2	-	-	-	-
	AEC	05AE01	Allied paper I : Mathematics – I	6	4	25	75	100
IV	SEC	06SE31	Solar Energy	2	2	25	75	100
			TOTAL	30	20			

FOURTH SEMESTER

Part	Study Component	Course Code	Course Title	Hours	Credit	CIA Marks	ESE Marks	Total Marks
I	Tamil	P1LT41	Sanga Ilakkiyamum Neethi Ilakkiyamum	6	3	25	75	100
	Sanskrit	P1LS41	Drama and History of Sanskrit Literature – IV					
II	English	P2LE41	English for Career and Professional Development	6	3	25	75	100
III	Core	06CT41	Analog Electronics	4	4	25	75	100
	Core	06CT42	Numerical Methods	4	4	25	75	100
	Core	06CP43	Major Practical – II	2	2	40	60	100
	AEC	05AE02	Mathematics - II	3	3	25	75	100
	AEC	05AE03	Mathematics – III	3	3	25	75	100
IV	SEC	06SE41	Astrophysics	2	2	25	75	100
			TOTAL	30	24			

FIFTH SEMESTER

Part	Study Component	Course Code	Course Title	Hours	Credit	CIA Marks	ESE Marks	Total Marks
III	Core	06CT51	Solid State Physics	6	5	25	75	100
	Core	06CT52	Digital Electronics	6	5	25	75	100
	Core	06CP53	Major Practical –III	9	5	40	60	100
	DSE	06EP5A	Object Oriented Programming with C++	5	5	25	75	100
		06EP5B	Programming with C	--	--	--	--	--
IV	SEC	06SE51	Fibre Optic Communication	2	2	25	75	100
	ES	ESUG51	Environmental Studies	2	2	25	75	100
			TOTAL	30	24			

SIXTH SEMESTER

Part	Study Component	Course Code	Course Title	Hours	Credit	CIA Marks	ESE Marks	Total Marks
III	Core	06CT61	Nuclear Physics	4	4	25	75	100
	Core	06CP62	Major Practical-IV	7	5	40	60	100
	DSE	06DS6A	Quantum Mechanics & Relativity	5	5	25	75	100
		06DS6B	Maintenance of Electrical and Electronic Equipments	--	--	--	--	--
	DSE	06DS6C	Project	6	5	100	--	100
IV	SEC	06SE61	Nano Technology	2	2	25	75	100
	SEC	06SE62	Physics for Competitive Examinations	2	2	25	75	100
	SEC	06SE63	Medical Instrumentation	2	2	25	75	100
	VE	VEUG61	Value Education	2	2	25	75	100
V	EA	EAUG61	Extension Activities		1	25	75	100
			TOTAL	30	28			

PART – I: TAMIL		SEMESTER : I
Course Title : கவிதை இலக்கியமும் கதை இலக்கியமும்		
Course Code : P1LT11	Hours per week : 6	Credits : 3
CIA : 25 Marks	ESE : 75 Marks	Internal: 100 Marks

முன்னுரை

1. மரபின் பழம்பெருமையினை உணர்தல்.
2. புதுக்கவிஞர்களின் படைப்பாக்கங்கள் வழி பொருள், கட்டமைப்பு அறிவித்தல்.
3. தனி மனித ஒழுக்கம் கடைபிடித்தல்.
4. தமிழ் எழுத்துக்களின் வகைமைகளை அறிதல்.
5. தமிழிலக்கியத்தின் மரபு மற்றும் புதுக்கவிதையின் வரலாற்றினை அறிவித்தல்.

பாடதிட்டத்தின் முடிவுகள்

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

NO.	ஊழரசளந முரவஉழஅந	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	உரைநடை இலக்கியத்தின் வாயிலாகவும், மரபுக்கவிதை - புதுக்கவிதையின் வாயிலாகவும் தனி மனித மற்றும் சமூக ஒழுக்கங்கள் குறித்து வரையறை செய்தல்.	K1, K2
CLO 2	உயிர் எழுத்துக்கள், மெய்யெழுத்துக்கள், உயிர்மெய்யெழுத்துக்கள், சார்பெழுத்துக்கள் ஆகியன குறித்தும் அவற்றை எழுதும் விதங்கள் குறித்தும் வகைப்படுத்தும் திறன் அறிதல்.	K2, K3
CLO 3	மரபுக்கவிதை வாயிலாக படைப்பாளர்களின் காலகட்டத்தையும், படைப்பின் வழியாக அக்காலகட்ட மக்களின் வாழ்க்கை நிகழ்வுகளின் வரலாற்றினையும் விவரித்தல்.	K2, K3
CLO 4	தாய் மொழியின் சிறப்பு, பொதுவுடைமை சிந்தனை, அறியாமை நீக்கல், உண்மைத்துறவு நிலை குறித்த சமூக நிலைகளை கலந்துரையாடுதல்	K2
CLO 5	மொழியினைப் பிழையின்றி எழுதுதல் - பேசுதல், ஒலி வேறுபாட்டினை அறிந்து மயக்கம் நீக்குதல் போன்ற ஒரு மொழியின் பயன்பாட்டுத் தன்மையைத் தெளிவுறுத்தல்.	K1, K2, K3

K₁-Remembering

K₂-Understanding

K₃-Applying

பாடதிட்டம்

அலகு : 1	புக்கவிதைகள் பாரதியார் கவிதைகள் 1. தமிழ் (நான்கு பத்தி) 2. நடிப்புச் சுதேசிகள் 2. பாரதிதாசன் கவிதைகள் 1. நீங்களே சொல்லுங்கள் 2. புதியதோர் உலகம் செய்வோம் நாமக்கல் கவிஞர் வெ.இராமலிங்கம் பிள்ளை 1.குருதேவர் இராமகிருஷ்ணர் (3 பாடல்கள்)	18மணிநேரம்
அலகு : 2	புதுக்கவிதைகள் 2.1 கவிஞர் கண்ணதாசன் (தேர்ந்தெடுக்கப்பெற்றவை) 2.2 கவிஞர் வைரமுத்து (தேர்ந்தெடுக்கப்பெற்றவை) 2.3 கவிஞர் மு.மேத்தா (தேர்ந்தெடுக்கப்பெற்றவை)	18மணிநேரம்
அலகு : 3	சிறுகதை நாவல் இலக்கியம் 3.1 (தேர்ந்தெடுக்கப்பெற்ற 5 சிறுகதைகள்) 3.2 நாவல் இலக்கியம் (துணிந்தவன்)	18மணிநேரம்
அலகு : 4	தமிழ் இலக்கணம் - எழுத்து முதல் எழுத்துக்கள்,சார்பெழுத்துக்கள் மொழி முதல் எழுத்துக்கள்,மொழி இறுதி எழுத்துக்கள் வல்லெழுத்து மிகும் இடங்கள்,வல்லெழுத்து மிகா இடங்கள்	18மணிநேரம்
அலகு : 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத் தமிழும் கவிதை இலக்கியத்தின் தோற்றமும் வளர்ச்சியும் கதை இலக்கியத்தின் தோற்றமும் வளர்ச்சியும் மரபுப்பிழை நீக்குதல் - பிறமொழிச் சொற்களை நீக்குதல்- பிழையற்ற தொடரைத் தேர்ந்தெடுத்தல் - ஒருமை பன்மை மயக்கம்- ஓர் எழுத்து ஒரு மொழிக்குரிய பொருள் - ஒலி வேறுபாடுகளும் பொருள் வேறுபாடுகளும் - பொருத்தமான பொருள் - பொருத்தமான தொடர் அறிதல்.	18மணிநேரம்

பார்வை நூல்கள்

1.தமிழ் இலக்கிய வரலாறு - பேரா.முனைவர் பாக்யமேரி,
நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட், 41-பி, சிட்கோ இண்டஸ்ட்ரியல்
எஸ்டேட்,அம்பத்தூர், சென்னை- 600 098.

2.தமிழ் இலக்கிய வரலாறு- மு.வரதராசனார்,சாகித்திய அகாடமி,தலைமை
பவன்,35,பெரோஸ்ஷா சாலை,புதுதில்லி.

அலுவலகம்,ரவீந்திர

பாட நூல்கள்

1. தமிழ்ச் செய்யுள் தொகுப்பு (தமிழ்த்துறை வெளியீடு)
2. சுவாமி சித்பவானந்தரின் சிந்தனைகள் (தமிழ்த்துறை வெளியீடு)

E-Resource

1. <https://www.youtube.com/watch?v=0ywU98OzxPk>
2. <https://www.youtube.com/watch?v=lbs-S0Ej3o>
3. <https://ta.wikipedia.org/wiki/%E0%AE%95%E0%AE%A3%E0%AF%8D%E0%AE%A3%E0%AE%A4%E0%AE%BE%E0%AE%9A%E0%AE%A9%E0%AF%8D>
4. <https://ta.wikipedia.org/s/zf>
5. <https://www.youtube.com/watch?v=bNxBG0EO18o>
6. <https://www.youtube.com/watch?v=oPnN6XrsFM>
7. <https://www.youtube.com/watch?v=unPtSMNeWLg>
8. https://podhutamizh.blogspot.com/2017/09/blog-post_42.html
9. https://podhutamizh.blogspot.com/2017/09/blog-post_15.html
10. <http://dhivyabharathy51097.blogspot.com/2017/04/blog-post.html>
11. <http://neelamegan.blogspot.com/2015/09/blog-post.html>

Mapping of CLO and PLO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	3	9	9	3	9	9
CLO2	9	3	9	3	9	3	9
CLO3	9	3	9	9	3	9	9
CLO4	9	1	3	9	9	-	9
CLO5	9	1	3	9	9	-	9
Weightage of the course	45	11	33	39	33	21	45
Weighted percentage of Course contribution to PLOs							

DEPARTMENT SANSKRIT

Programme: B.A./ B.Sc. (Under CBCS and LOCF)
(For those students admitted during the Academic Year 2021-22 and after)

PART – I : Sanskrit		SEMESTER - I
Course Title : FUNDAMENTAL GRAMMAR AND HISTORY OF SANSKRIT LITERATURE –I		
Course Code: PILS11	Hours per week: 6	Credits: 3
CIA Marks: 25 Marks	ESE Marks: 75 Marks	Total Marks: 100 Marks

Preamble:

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first four semesters the above column explains the scheme of the I semester.

Course Learning Outcomes (CLOs)

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

Number	Statement	Knowledge Level
CLO 1	Identifying Devanāgarī script, Describe modern literature and Illustrate	K1, K2
CLO 2	Discriminate spirituality in Literature	K2
CLO 3	Classify and discuss traditional names of Divine beings to animals in the world	K2
CLO 4	Describe and defend history of early Sanskrit literature	K2
CLO 5	Practice Creativity and Demonstrate various culture of world	K2, K3

K1-Knowledge **K2**-Understand **K3**-Apply

Syllabus

Unit 1: Introduction to Sanskrit script, Verbs, nouns and Pronouns. Introduction: Definitions and Scope of Sanskrit. – Sanskrit (Devanāgarī) scripts. Formation of verbs and nouns. Characteristics of pronoun.

Unit 2: Introduction to History of early (vedic) Sanskrit literature. Classification of Vedas. Content of Vedas. Moral values inculcated through Vedas.

Unit 3: Introduction to Purāṇa literature. Origin of Purāṇa literature. Classification of Purāṇa. Mahāpurāṇa and Upapurāṇa. moral, social, environmental values inculcated through Purāṇas.

Unit 4: Introduction to Kāvya (poetry) literature. Definition of Kāvya. Types of Kāvya. Characteristics of Mahākāvya. Description of moral, social, environmental values inculcated through Kāvya

Unit 5: Introduction to Translation. Strategies adopted in translation. Translating Sanskrit verses into English. Translating English sentences into Sanskrit. Introducing International Phonetic code (IPC). Transliteration from Sanskrit (Devanāgarī) script to IPC. Transliterating from IPC to Sanskrit (Devanāgarī) script.

Mapping of CO and PO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO 6	PLO 7
CLO1	9	9	3	9	9	-	9
CLO2	3	3	9	9	9	-	9
CLO3	9	3	9	9	9	-	3
CLO4	9	9	9	9	9	-	9
CLO5	9	9	3	9	9	-	9
Weightage of the course	39	33	33	45	45		39

Strong -9 Medium -3 Low -1

Text Book(s)

Sāhityarasakāṇa, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai -625010. Year of publication 1996.

A History of Sanskrit Literature, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai - 625010. Year of publication 1996.

Reference Books

A Short History of Sanskrit Literature, by T.K. Ramachandra Aiyar, published by R.S. Vadhyar & Sons, Kalpathi, Palakkad -678003

A History of Sanskrit Literature, by A. Berriedale Keith, published by Mothilal Banarsidass Publishers Private Limited, Delhi, 2017.

DEPARTMENT OF ENGLISH**Programme:** B.A., B.Sc., B.Com., & B.Com. (CA) (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 onwards)

PART – II : English		SEMESTER - I
Subject Title : ENGLISH FOR BASIC COMMUNICATION SKILLS		
Course Code: P2LE11/P2CE11	Hours per week: 6	Credit: 3
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

The students are expected to inculcate English language proficiency and its socio-linguistic competency.

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO1	Use and interpret imaginative, and creative skills through the poetic genre	K1,K2,K3
CLO2	Recognize listening, and reading proficiency through the prose discourses	K1,K2,K3
CLO3	State socio-linguistic influence of authors found in the short stories	K1,K2,K3
CLO4	Examine the properties of listening, speaking, reading, and writing activities to enhance English grammar usages	K1,K2,K3
CLO5	Execute and exercise LSRW skills in academic and career	K1,K2,K3

K1- Remembering K2 - Understanding K3 - Applying**Mapping of CO and PO**

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	9	9	3	9	3	9
CLO2	9	9	9	9	9	-	9
CLO3	9	9	9	9	9	3	9
CLO4	9	9	3	-	-	-	9
CLO5	9	9	9	3	3	-	9
Weightage of the course	45	45	39	24	30	06	45

Strong-9**Medium -3****Low -1****Syllabus****Unit-1 Poetry**

1. The Lord of My Life – Rabindranath Tagore
2. The Road Not Taken – Robert Frost
3. Hawk Roosting – Ted Hughes

Unit-2 Prose

1. The Secret of Work – Swami Vivekananda
2. Fourscore and Seven Years ago... – Abraham Lincoln
3. What Kind of Peace Do We Want? – J.F. Kennedy

Unit-3 Short Stories

1. A Shadow – R K Narayan
2. Karma – Khushwant Singh
3. The Romance of a Busy Broker – O Henry

Unit-4 Grammar

1. Parts of Speech
2. Kinds of Sentence
3. Punctuation

Unit-5 Oral & Written Communication

1. **Listening** – Comprehension practice from Poetry, Prose, Short-stories, observing/viewing E-content (with subtitles), Guest/Invited Lectures, Conference/Seminar Presentations & Tests and DD National News Live, BBC, CNN, VOA etc
2. **Speaking** – In Group Discussion Forum, speak about Tongue Twisters, Critical Thinking, Seminar Presentations on Classroom-Assignments, and Peer-Team interactions/AIF in Class-room
3. **Reading** – Pronunciation practice and enhancement from Poetry, Prose, Short-stories, Magazines, Newspaper etc
4. **Writing** – Asking & Giving Directions/Instructions, Developing Hints, and Filling Forms.

Text Books

1. *The Norton Anthology English Literature*. New York/London: W.W.Norton, 2012. (or) Vinay Harwadker, and A.K.Ramanujan, ed. *The Oxford Anthology of Modern Indian Poetry*. New Delhi: OUP, 1994. (or) Robert Anderson et al. *Elements of Literature: Fourth Course Literature of the United States*. Florida: HRW Inc. 1993. (or) Dr.M.Moovendhan, ed. *Wings of Poesy*. Chennai: Thamarai Publications, 2018. (or) <<https://www.poemhunter.com/poem/lord-of-my-life/>> The Lord of My Life – Rabindranath Tagore <<https://allpoetry.com/Hawk-Roosting>> Hawk Roosting <<https://poets.org/poem/road-not-taken>> The Road Not Taken.
2. Swami Vivekananda. “The Secret of Work.” *Links: Indian Prose in English*. Ed. G.S.Balarama Gupta. New Delhi: Macmillan Indian Limited, 1989.
3. Dr.P.C.James Daniel, ed. *Gateway to English: An Anthology of Prose*. Chennai: Harrows Publications, 2018. <http://www.abrahamlincolnonline.org/lincoln/speeches/gettysburg.htm>
4. Abhijit Acharjee, and Rakesh Ramamoorthy, ed. *Frontiers of Communication: An Anthology of Short Stories and Prose*. Chennai: Cambridge University Press, 2018.
5. Michael Swan and Catherine Walter. *How English Works: A Grammar Practice Book*. Oxford: OUP, 1997. (or) Wren and Martin. *High School English Grammar and Composition*. New Delhi: S.Chand & Company LTD.1935.
6. Owen Hargie, David Dickson, and Dennis Tourish. *Communication Skills for Effective Management*. New York: Palgrave Macmillan, 2004. (or)
7. British Council | LearnEnglish <<https://learnenglish.britishcouncil.org/skills>>
8. BBC News <<https://www.bbc.com/news>> VOA Learning English <<https://learningenglish.voanews.com/>>
9. University Grants Commission (UGC), New Delhi <<https://www.ugc.ac.in/subpage/EContent-URL.aspx>> British Council | LearnEnglish <<https://www.youtube.com/channel/UCOtnu-KKoAbN47luYMeDPOg>> Cambridge Assessment English <<https://www.cambridgeenglish.org/test-your-english/>>
10. CLIL (Content & Language Integrated Learning) – Module by TANSCHEN
Note: (Text: Prescribed chapters or pages will be given to the students by the department and the college)

Reference Books

1. Eileen Thompson et al. *Prentice Hall Literature: The English Tradition*. 2.Ed. New Jersey: Prentice-Hall Inc., 1989. (or) John Pfordresher et al. *England in Literature*. Illinois: Scott, Foresman & Co., 1989. (or) Board of Editors. *Pearls in a String: English for Communication*. Chennai: Emerald Publishers, 2009.
2. Stuart H King, ed. *New Vistas in English Prose*. Bombay: Blackie & Sons Publishers, 1980.
3. Swami Vivekananda. “Work and Its Secret: The Secret of Work.” *The Complete Works of Swami Vivekananda*. Vol-II. Kolkata: Advaita Ashrama, 1989.
4. MG Narasimha Murthy, ed. *Famous Indian Stories*. Mumbai: Orient BlackSwan, 2009.
5. Chambers. *English Grammar and Composition*. London: William and Robert Chambers, 1855.
6. J. C.Nesfield. *Manual of English Grammar and Composition*. London: Macmillan, 1908.
7. Dennis Freeborn. *A Course Book in English Grammar*. London: Macmillan, 1987.
8. Elaine Walker and Steve Elsworth. *Grammar Practice for Elementary Students*. Harlow (UK): Pearson, 2000.
9. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.

10. Raymond Murphy and Louise Hashemi. *English Grammar in Use Supplementary Exercises*. Cambridge: CUP, 2004.
11. K.V.Joseph. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.
12. British Council | LearnEnglish < <https://www.youtube.com/channel/UCOtnuKKoAbN47IuYMeDPOg>>
13. TOEFL Test < <https://www.ets.org/toefl>>

E Resources and References

Unit-1 Poetry

<https://www.enotes.com/topics/rabindranath-tagore/critical-essays/analysis-1>
<http://www.stfrancisschool.edu.in/uploads/studymaterial/2020-04-30-IX-English-2.pdf>
<https://www.slideshare.net/mithu12345/the-road-not-taken-113790468>
<https://allpoetry.com/Hawk-Roosting>
<https://www.litcharts.com/poetry/ted-hughes/hawk-roosting>

Unit-2 Prose

<http://xylemofenglish.blogspot.com/2016/05/the-secret-of-work-by-swami-vivekananda.html>
<https://www.slideserve.com/molimo/the-secret-of-work>
https://rmc.library.cornell.edu/gettysburg/good_cause/transcript.htm
<https://www.slideshare.net/micdshistory/abraham-lincoln-and-the-gettysburg-address>
<https://www.wagingpeace.org/john-f-kennedy-speaks-of-peace/>
<https://www.yourarticlelibrary.com/essay/essay-on-peace-need-and-importance-of-peace/40381>

Unit-3 Short Story

<https://englishsummary.com/lesson/a-shadow-summary-rk-narayan/#gsc.tab=0>
<https://brainly.in/question/1315290>
<https://ardhendude.blogspot.com/2014/04/theme-and-critical-analysis-of.html>
<http://sittingbee.com/karma-khushwant-singh/>
<https://americanliterature.com/author/o-henry/short-story/the-romance-of-a-busy-broker>
<http://sittingbee.com/the-romance-of-a-busy-broker-o-henry/>

Unit-4 Grammar

<https://www.learngrammar.net/english-grammar/en-parts-of-speech>
<https://www.learngrammar.net/english-grammar/sentence-definition-n-types>
<https://www.slideshare.net/ShabazSj/punctuations-and-their-use>

Unit-5 Oral & Written Communication

<https://content.byui.edu/file/b8b83119-9acc-4a7b-bc84-efacf9043998/1/Writing-2-5-2.html>
<https://www.towson.edu/careercenter/students/careerskills/communication.html>
<https://www.slideshare.net/shahbaazahmed15/bc-communication>
<https://www.inflibnet.ac.in/>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – I
Course Title : MECHANICS		
Course Code: 06CT11	Hours Per Week : 4	Credit: 4
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To gain more knowledge about Mechanics in order to

- Know about Newton's laws of motion
- Study of motion of the bodies
- Know about the system of particles
- Understanding momentum and kinetic energy
- Study of fluid dynamics

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Know the basic concept of Kinematics, Acceleration and Newton's laws of motion	K1, K2,K3
CLO 2	Understanding two and three dimensional motions	K1, K2,K3
CLO 3	Applying conservation of momentum in particle system	K1, K2,K3
CLO 4	Define and applications of angular momentum, angular velocity and force	K1, K2,K3
CLO 5	Know about the basic concepts of fluids and its applications	K1, K2,K3

K1-Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	MOTION IN ONE DIMENSION AND NEWTON'S LAWS: One Dimensional Kinematics - Motion with Constant Acceleration - Freely Falling Bodies - Newton's First Law - Force - Mass - Newton's Second Law - Newton's Third Law - Weight and Mass	(12 Hrs)
UNIT-II	MOTION IN TWO AND THREE DIMENSIONS: Motion in Three Dimensions with Constant Acceleration - Newton's Laws in Three Dimensional Vector form - Projectile Motion - Uniform Circular Motion - Frictional forces - The Dynamics of Uniform Circular Motion	(12 Hrs)
UNIT- III	MOMENTUM AND SYSTEM OF PARTICLES: Collisions - Linear Momentum - Impulse and Momentum - Conservation of Momentum - Two Body Collisions - Many Particles Systems - Center of Mass of Solid Objects - Conservation of Momentum in a System of Particles	(12 Hrs)
UNIT- IV	ANGULAR MOMENTUM AND WORK AND KINETIC ENERGY: Angular Momentum of a Particle - System of Particles - Angular Momentum and Angular Velocity - Conservation of Angular Momentum - Work done by a Constant Force - Power - Work done by a Variable Force - Kinetic Energy and the Work Energy Theorem - Work and K.E. in Rotational Motion	(12 Hrs)
UNIT- V	FLUID STATICS AND FLUID DYNAMICS: Fluids and Solids - Pressure and Density - Variation of Pressure in Fluid at Rest - Measurement of Pressure - General Concepts of Fluid Flow - Streamlines and Equation of Continuity - Bernoulli's Equation - Applications of Bernoulli's Equation and Equation of Continuity.	(12 Hrs)

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	9	1	1	1	1
CLO 2	9	3	9	1	1	1	1
CLO 3	9	3	9	1	1	1	1
CLO 4	9	3	9	1	1	1	1
CLO 5	9	3	9	1	1	1	1
Weightage of the course	45	15	30	5	5	5	5
Weighted Percentage of Course contribution to PLOs							

9- Strong**3 – Medium****1 – Low****Mapping of CLO with PSO**

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	9	1	3
CLO 2	9	9	9	1	3
CLO 3	9	9	9	1	3
CLO 4	9	9	9	3	3
CLO 5	9	9	9	3	3
Weightage of the course	45	45	45	9	15
Weighted Percentage of Course contribution to POs					

9 – Strong**3 – Medium****1 – Low****Text Book**

1. Physics, Volume 1, DAVID HALLIDAY, ROBERT RESNICK, KENNETH S.

KRANE 2002, fifth edition, John Wiley & Sons, Inc.

Unit I: 2-4, 2-5, 2-6, 3 - 2, 3 - 3, 3 - 4, 3 - 5, 3- 6, 3 - 7

Unit II: 4 -1, 4 -2, 4 - 3, 4 – 5, 5 - 3, 5 - 4

Unit III: 6-1, 6-2, 6-3, 6-4, 6-5, 7 -3, 7-4, 7-5

Unit IV: 10-1, 10-2, 10-3, 10-4, 11-1, 11-2, 11-3, 11-4, 11-6, 11-7

Unit V: 15-1, 15-2, 15-3, 15-3, 15-5, 16-1, 16-2, 16-3, 16-7.

Reference Books

1. Physics for Scientists and Engineers with Modern Physics, Raymond A. Serway, Fourth Edition, Saunders College Publishing, 1995.
2. Mechanics- D.S. Mathur - S.Chand and Company Ltd., 2007.
3. Modern Physics- R.Murugesan, Kiruthiga Sivaprasath- 14th Revised multicolor Edition, 2008
4. Introduction to Solid Mechanics” by I.H. Shames, 2009.

E-Resources

1. http://mechanicsmap.psu.edu/websites/8_newtons_particle/1_d_equation_of_motion/1_d_equation_of_motion.html
2. <https://byjus.com/physics/difference-between-mass-and-weight/>
3. <https://courses.lumenlearning.com/physics/chapter/3-4-projectile-motion/>
4. <https://byjus.com/physics/uniform-circular-motion/>
5. <https://www.vedantu.com/physics/frictional-force>
6. <https://www.toppr.com/guides/physics/system-of-particles-and-rotational-dynamics/linear-momentum-system-particles/>
7. <https://openstax.org/books/university-physics-volume-1/pages/11-3-conservation-of-angular-momentum>
8. <http://www.physics.umd.edu/courses/Phys260/agashe/S09/notes/lecture4.pdf>
9. <https://www.youtube.com/watch?v=9bdGZkkHukA>
10. <https://www.youtube.com/watch?v=xZ4CEsuSUII>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – I
Course Title : ELECTROMAGNETISM		
Course Code: 06CT12	Hours Per Week : 4	Credit: 4
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To gain knowledge about the electrical energies in order to

- Learn about charges and its electric field
- Study of electric potential and charge storing in capacitor
- Understanding ohms law and its applications
- Study of magnetic field and its applications
- Know about the working principles of ac and dc motors

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Know the basic concept of charge, Super position Principle, Electric Field, Gauss's law, Coulomb's theorem and applications electric Field	K1, K2,K3
CLO 2	Understanding the potential Difference, relation between Electric field and Electric Potential, capacitors, Types and applications of capacitors	K1, K2,K3
CLO 3	Define and applications of Ohms law	K1, K2,K3
CLO 4	Applying the magnetic induction using Biot - Savat Law and Ampere's circuital law for Hemholtz Tangent Galvanometer, Ballistic Galvanometer.	K1, K2,K3
CLO 5	Discuss the basic concept of LCR series and parallel resonant circuit and ac & dc motors	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	CHARGE AND FIELDS Basic concepts - Coulomb's law - Super position Principle - Electric Field - Electric Field due to a point charge - Electric Dipole - Potential Energy of a Dipole in uniform Electric field - Electric field due to an Electric Dipole at an axial point - Electric field at a point on the equatorial line - Electric field due to an Electric dipole at any point - Lines of force - Gauss's law - Differential form of Gauss law - An Insulated conductor - Electric field due to a uniformly charged sphere - Coulomb's theorem	(12 Hrs)
UNIT-II	ELECTRIC POTENTIAL AND CAPACITORS Potential Difference - Electric Potential as line Integral of Electric Field - Potential at a point due to a point charge - Relation between Electric field and Electric Potential. Capacitance of a spherical capacitor (outer and inner sphere earthed) - Capacitance of a cylindrical capacitor, Parallel plate capacitor - Capacitors in series and parallel - Energy stored in a charged capacitor - Change in energy of a parallel plate capacitor - Loss of energy on sharing of charges between two capacitors - Force of attraction between plates of a charged parallel plate capacitor - Types of capacitors	(12 Hrs)

UNIT- III	CURRENT AND RESISTANCE MEASUREMENTS Current and current density - Expression for current density - Equation of continuity-Ohm's law and Electrical conductivity-Carey Foster bridge - Potentiometer - measurement of Low resistance (Kelvin Double Bridge method) comparison of capacitances of two capacitors - capacitance of capacitor (Kelvin's null method)	(12 Hrs)
UNIT- IV	MAGNETIC EFFECT OF ELECTRIC CURRENT Introduction - The Biot - Savat Law - Magnetic induction at a point due to straight conductor, circular coil carrying current - Hemholtz Tangent Galvanometer - Magnetic Induction at any point on the axis of a solenoid - moving coil Ballistic Galvanometer - current and voltage sensitivities of moving coil galvanometer measurement of charge sensitiveness - absolute capacitance of a capacitor - comparison of two capacitance using B.G - Ampere's circuital law - Differential form of Ampere's law - Divergence of magnetic field vector B - Magnetic field inside a long solenoid	(12 Hrs)
UNIT- V	AC CURRENT, AC & DC MOTORS EMF Induced in a coil rotating in a magnetic field - AC circuit containing resistance, inductance and capacitance in Series - Parallel resonant circuit - Power in AC circuit. Containing resistance, inductance and capacitance - wattles current - choke coil - The transformer - Three phase AC generator - Distribution of three phase alternating current - Alternating current dynamo - Two phase AC generator- DC dynamos - Field excitation-DC motor	(12 Hrs)

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	1	1	1	-	3
CLO 2	9	3	3	3	-	-	-
CLO 3	9	9	3	1	1	-	3
CLO 4	9	9	1	1	3	-	-
CLO 5	9	3	3	1	-	1	-
Weightage of the course	45	27	11	7	5	1	6
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	3	3
CLO 2	9	9	3	1	3
CLO 3	9	9	1	3	1
CLO 4	9	3	3	1	-
CLO 5	9	3	3	--	-
Weightage of the course	45	33	13	8	7
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Book

- Electricity and Magnetism by R. Murugesan, S.Chand & Company Ltd., New Delhi (Fifth Edition -2003)
Unit - I: Chapter 1 & 2 (1.1 - 1.11, 2.2 - 2.5, 2.11)
Unit - II: Chapter 3 & 4 (3.1 - 3.4, 4.2 - 4.5, 4.8 - 4.13)

Unit - III: Chapter 6 & 7 (6.1 - 6.4, 7.1 - 7.5)

Unit - IV: Chapter 10 (10.1 - 10.6, 10.11-10.15, 10.17-10.20)

Unit - V: Chapter 13 & 14 (13.1 - 13.7, 14.1 – 14.7)

Reference Books

1. Electricity and magnetism by Brijlal and Subramaniam Ratan Prakashan Educational & University Publishers
2. Electricity and magnetism by D.C Tayal, Himalaya Publishing house, Mumbai, 2002.
3. Electromagnetism : Problems with solutions, by Ashutosh Pramanik, PHI, 2006
4. Electromagnetic Fields, Jean G. Van Bladel John Wiley & Sons, 2007
5. Introduction to Electrodynamics, David J. Griffiths, Third edition, Pearson, Cambridge University Press

E-Resource

1. <https://www.physicsclassroom.com/class/estatics/Lesson-3/Coulomb-s-Law>
2. <http://hyperphysics.phy-astr.gsu.edu/hbase/electric/gaulaw.html>
3. <https://www.physicsclassroom.com/class/circuits/Lesson-1/Electric-Potential>
4. https://www.electronics-tutorials.ws/capacitor/cap_1.html
5. <https://www.elprocus.com/what-is-a-carey-foster-bridge-its-working/>
6. <https://www.electrical4u.com/biot-savart-law/>
7. <https://youtu.be/5Xjn7KAQ2uA>
8. <https://www.youtube.com/watch?v=CWulQ1ZSE3c>

DEPARTMENT OF CHEMISTRY

Programme: B.Sc.Physics, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: AEC		SEMESTER I
Course Title: CHEMISTRY FOR PHYSICIST-I		
Course Code: 07AEP1	Hours per week: 4	Credits: 4
CIA Marks: 25Marks	ESE Marks: 75 Marks	Total Marks: 100 Marks

Preamble

Students are enabled to

- ✓ Understand the basic concepts of atomic structure
- ✓ Acquire knowledge on chemical bonding
- ✓ Gain an idea about nuclear chemistry and principles of titrimetry

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Recall and describe the basic concepts of atomic structure	K1, K2 & K3
CLO 2	Identify the element in the periodic table and comprehend the periodicity	K1, K2 & K3
CLO 3	Demonstrate and predict the molecular structure using VBT and VSEPR theory	K1, K2 & K3
CLO 4	Illustrate the various types of bonding and discuss the molecular orbital theory	K1, K2 & K3
CLO 5	Experiment and demonstrate basics of titrimetry	K1, K2 & K3

K₁-Remembering

K₂-Understanding

K₃-Applying

Mapping of CLO and PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO5	PLO6	PLO7
CLO 1	3	1	1	1	1	1	3
CLO 2	3	1	1	1	1	1	3
CLO 3	3	1	1	1	1	1	3
CLO 4	3	1	1	1	1	1	3
CLO 5	3	1	1	1	1	1	3
weightage of the course	15	5	5	5	5	5	15

Mapping of CLO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CLO 1	3	1	1	1	1
CLO 2	3	1	1	1	1
CLO 3	3	1	1	1	1
CLO 4	3	1	1	1	1
CLO 5	1	3	1	1	3
Weightage of the course	13	7	5	5	7

Syllabus

UNIT-I: ATOMIC STRUCTURE

Bohr's model of the atom – postulates – derivation of Bohr's energy of electron in hydrogen atom – origin of hydrogen spectrum – Sommerfeld's extension of Bohr's theory – de Broglie equation – Heisenberg uncertainty principle – atomic orbitals – shapes of s, p and d orbitals – Aufbau principle – Hund's rule – Pauli's exclusion principle – electronic configuration of elements. (up to atomic number 30).

UNIT-II: PERIODIC PROPERTIES

Periodic table, name and symbol of the elements (upto atomic number 30) – interpretation of periodic properties of the

elements in terms of their electronic configuration – atomic radius, ionic radius – ionization potential – electron affinity – electronegativity – difference between electron affinity and electronegativity – factors affecting the periodic properties – determination of electronegativity by Pauling and Mulliken's methods.

UNIT-III: CHEMICAL BONDING – I

Valence bond theory: Postulates, formation of simple molecules like H_2 , O_2 , and N_2 – sigma bond and pi bond – formation of H_2 , F_2 and HF via s-s, p-p and s-p overlapping – hybridization, sp, sp^2 and sp^3 hybridization – Valence Shell Electron Pair Repulsion theory (VSEPR theory), application to H_2O , NH_3 , CH_4 , PCl_5 , $BeCl_2$, BF_3 and SF_6 .

UNIT-IV: CHEMICAL BONDING – II

Molecular orbital theory, postulates, bond order, magnetic properties, MO diagrams for H_2 , He^+ , N_2 and O_2 . covalent bond, polar covalent bond, non-polar covalent bond and Fajan's rule – Ionic bond: properties, factors favoring formation of ionic compounds, lattice energy, Born-Haber cycle – metallic bond – hydrogen bond, definition, intermolecular and intramolecular hydrogen bond.

UNIT-V: GENERAL PRINCIPLES OF TITRIMETRY

Introduction – concept of molecular weight, equivalent weight, concentrations terms, molarity, normality, weight percentage – principle of titrimetry – primary and secondary standard – preparing standard solutions – standardizing the secondary standard solutions.

Text Book

1. Lee, J.D. *Concise Inorganic Chemistry*, 5th Ed., Blackwell Science Ltd., 2006.
2. Puri, B.R., Sharma, L.R. and Kalia, K.C. *Principles of Inorganic Chemistry*, 33rd Ed., Vishal Publishing, 2017.

Reference Books

1. Cotton, F.A., Wilkinson, G. and Gus, P.L., *Basic Inorganic Chemistry*, 3rd Ed., John Wiley & Sons (Asia) Pvt. Ltd., 2007.
2. Douglas, B.E., McDaniel, D.H., Alexander, J.J. *Concepts and Models of Inorganic Chemistry*, 3rd Ed., John Wiley & Sons, 1999.

E - Resources

1. <https://www.youtube.com/watch?v=9SJ17nQczpQ>
2. <https://www.youtube.com/watch?v=ApkSfJQFR5A>
3. https://www.youtube.com/watch?v=1Vju_RxWFWo
4. <https://www.youtube.com/watch?v=AmedDfE0UNI>
5. <https://www.youtube.com/watch?v=FAKxpYS3Xe4>

DEPARTMENT OF PHYSICS

Programme: B.Sc., Physics, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : GEC		Semester – I
Course Title : SPACE SCIENCE		
Course Code: 06GE11	Hours Per Week : 2	Credit: 2
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

The students to gain knowledge about space science in order to

- ❖ Learn the concepts of Solar System
- ❖ Learn the stars and galaxies and how it all began
- ❖ Acquire basic knowledge of communication systems and its various parts
- ❖ Differentiate the AM and FM and also to learn fiber optics technology
- ❖ Understanding the function of satellite, rocket and its launching

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Understanding the concept of solar system and its properties	K1,K2 & K3
CLO 2	Learn the STARS, Galaxies and the Universe and how it all began	K1,K2 & K3
CLO 3	Gain the information regarding the Communication systems and its various parts	K1,K2 & K3
CLO 4	Understanding the concept of Modulation and its types and Fiber Optics Technology and its uses	K1,K2 & K3
CLO 5	Understanding the function of satellite, rocket and its launching	K1,K2 & K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	PLANETARY SYSTEM-I Solar system – The Moon: Closed Neighbor, Veiled Venus – Scorched Mercury – Mars, the Red planet – Jupiter the Giant	(6 Hrs)
UNIT-II	PLANETARY SYSTEM-II Saturn and its Rocky rings – Mysterious Uranus, Neptune – Other Giant, Pluto - The Far traveller – STARS, Galaxies, and the Universe and how it all began	(6Hrs)
UNIT- III	COMMUNICATION SYSTEM-I Communication system - Information – Transmitter – Channel – Noise –Receiver	(6 Hrs)
UNIT- IV	COMMUNICATION SYSTEM-II Modulation – Amplitude Modulation – Frequency Modulation – Band width requirements – Fiber Optics Technology	(6 Hrs)
UNIT- V	SATELLITE AND LAUNCHING Satellite and Launching - Multistage Rocket – Pay load – Geo stationary Satellites – Fuel used in satellites – Launching	(6Hrs)

Text Books

1. Satellite Operations, John T. Garner and Malcolm Jones 1990
2. Electronic Communication Systems, Kennedy DAVIS, Tata McGraw Hill,1999,
3. The History of Science from 1946 to the 1990's, Ray Spangenburg and Diane K.Moser, The Universities Press Book

Reference Books

1. Fundamentals of Space Systems, V. L. Pisacane and R. C. Moore, Oxford University Press, 1994
2. Encyclopedia of space, Heather Couper, Nigel Henbest Publisher: Dorling Kindersley, 2009

E-Resource

1. <https://www.britannica.com/science/solar-system>
2. <https://www.vedantu.com/physics/communication-systems>
3. <https://www.electronics-notes.com/articles/radio/modulation/amplitude-modulation-am.php>
4. <https://www.electronics-notes.com/articles/radio/modulation/frequency-modulation-fm.php>
5. https://www.tutorialspoint.com/satellite_communication/satellite_communication_launching.htm
6. <https://www.electronics-notes.com/articles/satellites/basic-concepts/launching-satellites-into-orbit-techniques.php>

PART – I : TAMIL		SEMESTER : II
Course Title : இடைக்கால இலக்கியமும் நாடக இலக்கியமும்		
Course Code : P1LT21/P1CT21	Hours per week : 6	Credits : 03
CIA : 25	ESE : 75 Marks	Total: 100 Marks

முன்னுரை

1. சமூக வெளிப்பாடுகளை உணர்த்துதல்
2. தனிமனித நேர்மை உணர்த்துதல்
3. பக்தி மற்றும் நாடகம் பற்றிய அடிப்படை அறிவை புகட்டுதல்
4. கணினிச் சொற்களின் வகைமை அறிதல்
5. சைவ-வைணவ, சிற்றிலக்கியம், நாடகம்- ஆகியவற்றின் வரலாற்றினைத் தெளிவுபடுத்துதல்

பாடதிட்டத்தின் முடிவுகள்

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

NO.	ஊழரசளந முரவஉழுஅந	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	பக்தி மற்றும் சிற்றிலக்கியத்தின் வாயிலாக தனி மனித மற்றும் சமூக ஒழுக்கங்கள் குறித்த தன்மையினை வரையறை செய்தல்.	K1, K2
CLO 2	பக்தி இலக்கியங்கள் மற்றும் சிற்றிலக்கியங்கள் குறித்த செய்திகளைக் கலந்துரையாடுதல்.	K2, K3
CLO 3	சைவம் - வைணவம், சிற்றிலக்கியம், நாடகம் போன்ற இலக்கியத்தின் தன்மைகளையும், அதனைப் படைத்த படைப்பாளர்களின் வரலாற்றினையும் விவரித்தல்.	K2, K3
CLO 4	பெயர் - வினை, வினா - விடை, வேற்றுமை, தொகைகள் ஆகியன குறித்த தெளிவும், அவற்றை வகைப்படுத்தும் திறன் குறித்தும் அறிதல்.	K2
CLO 5	கணினியில் தமிழ் மொழியின் பயன்பாட்டுத் தன்மையை தெளிவுறுத்தல்.	K1, K2, K3

K₁-Remembering

K₂-Understanding

K₃-Applying

பாடதிட்டம்

அலகு - 1	சைவ இலக்கியம் - வைணவ இலக்கியம் 1.1 தேவாரம் - திருஞானசம்பந்தர் (திருவேடகப்பதிகம்) 1.2 திருவாசகம் - மாணிக்கவாசகர் (பிடித்த பத்து) 1.3 திருமொழி - திருமூலர் (தேர்வுசெய்யப்பெற்ற 10 பாடல்கள்) 1.4 திருப்பாவை - ஆண்டாள் (தேர்வுசெய்யப்பெற்ற 10 பாசுரங்கள்) 1.5 பெரிய திருமொழி - குலசேகரஆழ்வார் (தேர்வுசெய்யப்பெற்ற 10 பாடல்கள்)	(18 மணிநேரம்)
அலகு - 2	சிற்றிலக்கியம் 2.1 முக்கூடற் பள்ளு (தேர்வு செய்யப்பெற்ற பாடல்) 2.2 நந்திக்கலம்பகம் (தேர்வு செய்யப்பெற்ற பாடல்) 2.3 கலிங்கத்துப்பரணி (தேர்வு செய்யப்பெற்ற பாடல்) 2.4 தமிழ்விடு தூது (தேர்வு செய்யப்பெற்ற பாடல்) 2.5 பிள்ளைத் தமிழ் (தேர்வு செய்யப்பெற்ற பாடல்) 2.6 குற்றாலக்குறவஞ்சி (தேர்வு செய்யப்பெற்ற பாடல்)	(18 மணிநேரம்)
அலகு - 3	நாடக இலக்கியம் 1. வைகையில் வெள்ளம் வரும் (சேதுபதி)	(18 மணிநேரம்)
அலகு - 4	தமிழ் இலக்கணம் - சொல் 4.1 பெயர்ச்சொல் - வினைச் சொல் 4.2 வினா - விடை வகைகள் 4.3 வேற்றுமைகள் 4.4 தொகைகள்	(18 மணிநேரம்)
அலகு - 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும் 1.1 பக்தி இலக்கியத்தின் தோற்றமும் வளர்ச்சியும். 1.2 சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும். 1.3 நாடகத்தின் தோற்றமும் வளர்ச்சியும். 1.4 கணினித்தமிழ் அறிமுகம் - கணினி ஆங்கிலச்சொல்லுக்கு நிகரான தமிழ்ச் சொல் அறிதல்.	(18 மணிநேரம்)

Mapping of CLO and PLO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	3	3	9	9	3	9
CLO2	9	3	9	9	9	3	9
CLO3	9	1	3	9	9	3	9
CLO4	9	-	3	9	9	-	9
CLO5	9	-	3	3	3	-	9
Weightage of the course	45	07	21	39	39	09	45
Weighted percentage of Course contribution to POs							

பாட நூல்கள்

1. பக்தி இலக்கிய செய்யுள் தொகுப்பு, தமிழ்த்துறை வெளியீடு
2. சிற்றிலக்கிய செய்யுள் தொகுப்பு, தமிழ்த்துறை வெளியீடு
3. வைகையில் வெள்ளம் வரும் - சேதுபதி
4. தமிழ் இலக்கிய வரலாறு - முனைவர்பாக்யமேரி, நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட், 41-பி, சிட்கோ இண்டஸ்ட்ரியல் எஸ்டேட், அம்பத்தூர், சென்னை- 600 098.

பார்வை நூல்கள்

1. மக்கள் தகவல் தொடர்பியல் அறிமுகம் (டாக்டர் கி. இராசா)
2. இதழியல் (ச.ஈஸ்வரன்)
3. இதழியல் (டாக்டர் இரா.கோதண்டபாணி)
4. இதழியல் ஓர் அறிமுகம் (டாக்டர் அந்தோணி இராசு)
5. தமிழ் இலக்கிய வரலாறு (மு.வரதராசனார்)

E-Resource

1. http://www.tamilvu.org/library/nationalized/pdf/44-avvai_durasami_pillai/sievaillakiyavaralaru.pdf
2. <https://www.keetru.com/index.php/2009-10-07-10-44-25/2011-sp-41283151/17598-2011-11-30-03-20-32>
3. <http://www.tamilvu.org/courses/degree/p103/p1033.pdf>
4. <https://www.youtube.com/watch?v=OPOW-e7jFo8>
5. <https://www.youtube.com/watch?v=X0PtXv3l5oc>
6. <https://nandycraft.com/vetrumai.html>
7. <https://www.youtube.com/watch?v=uOF87NDPhVY>
8. <https://www.youtube.com/watch?v=Lk9-xG4HXzk>

Programme: B.A./ B.Sc. (Under CBCS and LOCF)
(For those students admitted during the Academic Year 2021-22 and after)

PART – I : Sanskrit		SEMESTER – II
Course Title: POETRY, GRAMMAR & HISTORY OF SANSKRIT LITERATURE – II		
Course Code: P1LS21	Hours per week: 6	Credits: 3
CIA Marks: 25 Marks	ESE Marks: 75 Marks	Total Marks: 100 Marks

Preamble:

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first four semesters the above column explains the scheme of the II semester.

Course Outcomes (COs)

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

Number	Statement	Knowledge Level
CLO 1	To understand Sanskrit poetry literature	K1, K2
CLO 2	Comparing literature with modern life	K2
CLO 3	Classify and discuss the importance of Sanskrit literature	K2
CLO 4	Describe and defend history of early Sanskrit literature	K2
CLO 5	Practice Creativity and Demonstrate different aspects of life as portrayed in Sanskrit literature	K2, K3

K1-Knowledge

K2-Understand

K3-Apply

Syllabus

Unit 1: Introduction to Sanskrit poetry literature such as Gnostic, Didactic and devotional. Campū literature and its contents.

Unit 2: Kalividambanam- scholars - teachers- Astrologers.

Unit 3: Kalividambanam- Physicians - Relatives- Pseudo Monks.

Unit 4: Sabhāraṇjanaśatakam -Wisdom and its acquisition

Unit 5: Sabhāraṇjanaśatakam- Poetry

Mapping of CO and PO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO 6	PLO 7
CLO1	3	9	9	9	9	1	9
CLO2	9	9	3	9	9	-	9
CLO3	3	3	9	9	9	-	9
CLO4	9	9	9	9	3	-	9
CLO5	9	9	9	9	3	-	9
	33	39	39	45	33	1	45

Strong -9

Medium -3

Low -1

Text Book(s)

1. Kalividambanam and Sabhāraṇjanaśatakam of Nilakṇṭhaśrī Translated into English by Dr. Srinivasa Sharma and Prof C.R. Anantaraman pub. Sri Sadguna Publication, Chidambaram- 2. Yr. 2014.
2. A Short History of Sanskrit Literature, by T.K. Ramachandra Aiyar, published by R.S. Vadhyar & Sons, Kalpathi, Palakkad -678003

Reference Books

A History of Sanskrit Literature, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai -625010. Year of publication 1996.

Programme: B.A., B.Sc., B.Com., & B.Com. (CA) (Under CBCS and LOCF)
(For those students admitted during the Academic Year 2021-22 onwards)

PART – II : English		SEMESTER - II
Subject Title : ENGLISH FOR ADVANCED COMMUNICATION SKILLS		
Course Code: P2LE21/P2CE21	Hours per week: 6	Credit: 3
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

The students are expected to inculcate English language proficiency and its socio-linguistic competency.

Course Outcome (CO):

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

No	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO1	Interpret philosophical thoughts and language mastery found in the poetry	K1, K2, K3
CLO2	Repeat listening, and reading proficiency through the prose discourses	K1, K2, K3
CLO3	Discuss the socio-linguistic and psychological behaviour of author, and characters found in the drama/play	K1, K2, K3
CLO4	Examine the properties of listening, speaking, reading, and writing activities to enhance English grammar usages	K1, K2, K3
CLO5	Exercise LSRW skills	K1, K2, K3

K1 – Remembering K2–Understanding K3 – Applying

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	3	9	9	9
CO2	9	9	9	9	9	1	9
CO3	9	9	9	9	9	3	9
CO4	9	9	3	-	-	-	9
CO5	9	9	9	3	9	-	9
	45	45	39	24	36	13	45

Strong-9

Medium -3

Low -1

Syllabus

Unit-1 Poetry

1. Alfred, Lord Tennyson – *Ulysses*
2. Nissim Ezekiel – *Night of the Scorpion*
3. Robert Frost – *Stopping by Woods on a Snowy Evening*

Unit-2 Prose

1. Swami Vivekananda – *Sisters and Brothers of America*
2. Martin Luther King Jr. – *I Have a Dream*
3. Francis Bacon – *Of Friendship*

Unit-3 Drama

William Shakespeare – *The Merchant of Venice*
(For the three Continuous Internal Assessment [CIA] Tests)

Unit-4 Grammar

1. Auxiliary (Helping) and Modal Verbs
2. Tenses
3. Question Tags

Unit-5 Oral & Written Communication

1. **Listening** – Comprehension practice from Poetry, Prose, Drama /Online Voice Practice, observing/viewing E-content (with subtitles), Guest/Invited Lectures, Conference/Seminar Presentations & Tests, and BBC, CNN, DD National News Live, VOA etc
2. **Speaking** – In Group Discussion Forum, speak about Theatrical/Dramatic Enactment, Body- Language, Mock-Interview, Seminar Presentations on Classroom-Assignments, and Peer-Team-interactions/AIF in Class-room
3. **Reading** – Intonation practice and its enhancement from Poetry, Prose, Drama, News-Paper, and Individual-Assignments
4. **Writing** – Writing Formal Letters/Résumé Preparation, Transcoding (graphs, diagrams, Charts and data), and Report Writing.*

Text Books

1. Anderson et al. *Elements of Literature: Fourth Course Literature of the United States*. Florida: HRW Inc. 1993. (or) Vinay Harwadker, and A.K.Ramanujan, ed. *The Oxford Anthology of Modern Indian Poetry*. New Delhi: OUP, 1994. *The Norton Anthology English Literature*. New York/London: W.W.Norton, 2012. (or) Dr.M.Moovendhan, ed. *Wings of Poesy*. Chennai: Thamarai Publications, 2018. (or)
<<https://www.poemhunter.com/poem/night-of-the-scorpion/>>
<<https://www.poetryfoundation.org/poems/44475/la-belle-dame-sans-merci-a-ballad>>
<<https://poets.org/poem/stopping-woods-snowy-evening>>
 2. Swami Vivekananda. *Sisters and Brothers of America*, (Chicago address at the World Parliament of Religions, 11th Sep, 1893.) <<http://www.advaitayoga.org/advaitayogaarticles/svchicagoadd.html>>
 3. Dr.P.C.James Daniel, ed. *Gateway to English: An Anthology of Prose*. Chennai: Harrows Publications, 2018.
 4. William Shakespeare. *The Merchant of Venice*. Ed. John Russell Brown. London: Methuen & Co., 1905. <<https://archive.org/details/in.ernet.dli.2015.126032/page/n7/mode/2up>> (or) Peter Alexander. *William Shakespeare: The Complete Works*. London: The English Language Book Society and Collins, 1964.
 5. Michael Swan and Catherine Walter. *How English Works: A Grammar Practice Book*. Oxford: OUP, 1997. (or) Wren and Martin. *High School English Grammar and Composition*. New Delhi: S.Chand& Company LTD.1935.
 6. Owen Hargie, David Dickson, and Dennis Tourish. *Communication Skills for Effective Management*. New York: Palgrave Macmillan, 2004. (or)
 7. British Council | LearnEnglish<<https://learnenglish.britishcouncil.org/skills>>
 8. BBC News <<https://www.bbc.com/news>>
 9. VOA Learning English <<https://learningenglish.voanews.com/>>
 10. University Grants Commission (UGC), New Delhi <<https://www.ugc.ac.in/subpage/EContent-URL.aspx>>
 11. British Council | LearnEnglish<<https://www.youtube.com/channel/UCOtnu-KKoAbN47IuYMeDP0g>>
Cambridge Assessment English <<https://www.cambridgeenglish.org/test-your-english/>>
 12. CLIL (Content & Language Integrated Learning) – Module by TANSCHÉ
- NOTE: (Text: Prescribed chapters or pages will be given to the students by the department and the college)

Reference Books

1. Eileen Thompson et al. *Prentice Hall Literature: The English Tradition*. 2.Ed. New Jersey: Prentice-Hall Inc., 1989. (or) John Pfordresher et al. *England in Literature*. Illinois: Scott, Foresman& Co., 1989. (or) Steuart H King, ed. *New Vistas in English Prose*. Bombay: Blackie & Sons Publishers,1980.
2. The Art Institute of Chicago, “Sisters and Brothers of America!”
<<https://www.artic.edu/articles/710/sisters-and-brothers-of-america>>
3. Dr.A.Shanmugakani, ed. *Prose for Communication: An Anthology of Prose*. Madurai: Manimekala Publishing House, 2008.
4. William James Craig, ed. *The Complete Works of William Shakespeare*. London: Oxford University Press, 1914.
5. William Shakespeare. *The Merchant of Venice*. London: J.Tonson, 1734.
<https://archive.org/details/merchantofvenice00shak_11/page/36/mode/2up>
6. George Yule. *Oxford Practice Grammar Advanced*. Oxford: OUP, 2006.
7. L.G.Alexander. *Longman English Grammar Practice for Intermediate Students*. Harlow (UK): Longman, 1990.

8. Roger Berry. *English Grammar: A Resource Book for Students*. London: Routledge, 2012.
9. K.V.Joseph. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.
10. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.

E Resources and References

Unit-1 Poetry

<https://www.litcharts.com/poetry/alfred-lord-tennyson/ulysses>
<https://www.poetryfoundation.org/poems/45392/ulysses>
<https://owlcation.com/humanities/Analysis-of-Poem-The-Night-of-the-Scorpion-by-Nissim-Ezekiel>
<https://literaryyog.com/night-scorpion-nissim-ezekiel/>
<https://www.poetryfoundation.org/poems/42891/stopping-by-woods-on-a-snowy-evening>
<https://studymoose.com/analysis-of-stopping-by-woods-on-a-snowy-evening-by-robert-frost-essay>

Unit-2 Prose

<https://thejeshgn.com/wiki/great-speeches/sisters-and-brothers-of-america-swami-vivekananda/>
<https://www.ukessays.com/essays/english-language/speech-analysis-martin-luther-kings-i-have-a-dream-speech-7887.php>
<https://litpriest.com/essays/of-friendship-summary-analysis-francis-bacon/>

Unit-3 Drama

<https://www.shakespeare.org.uk/explore-shakespeare/shakespeadia/shakespeares-plays/merchant-venice/>
<https://www.rsc.org.uk/the-merchant-of-venice/about-the-play/famous-quotes>
<https://www.litcharts.com/lit/the-merchant-of-venice/characters>
<https://www.slideshare.net/ciaffaroni/the-merchant-of-venice-62390271>

Unit-4 Grammar

<https://www.gingersoftware.com/content/grammar-rules/verbs/auxiliary-or-helping-verbs/>
https://www.englisch-hilfen.de/en/grammar/english_tenses.htm
https://www.grammar.cl/Intermediate/Question_Tags.htm

Unit-5 Oral & Written Communication

<https://content.byui.edu/file/b8b83119-9acc-4a7b-bc84-efacf9043998/1/Writing-2-5-2.html>
<https://www.towson.edu/careercenter/students/careerskills/communication.html>
<https://www.slideshare.net/shahbaazahmed15/bc-communication>

DEPARTMENT OF PHYSICS

Programme: B.Sc., Physics, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – II
Course Title : THERMODYNAMICS & STATISTICAL MECHANICS		
Course Code: 06CT21	Hours Per Week : 4	Credit: 4
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To enable the students to

- Deals with the basic principle and laws of thermodynamics
- Emphasize is made in the general study of the behavior of real gases
- It discusses the statistical basis of thermodynamics
- Gives an idea about quantum statistics.

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Outline the heat transmission and black body spectrum	K1,K2,K3
CLO 2	Understanding the behavior of real gases	K1, K2,K3
CLO 3	Applying laws of thermodynamics in day to day life	K1, K2,K3
CLO 4	Understanding the basic concept of Maxwell laws and its applications	K1 ,K2,K3
CLO 5	Know the need of quantum statistics	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	TRANSMISSION OF HEAT Coefficient of thermal conductivity - Forbe's method to find K - Lee's method for bad conductors – Spherical Shell Method-Cylindrical FLOW of a Heat - Wiedemann - Franz law – Stefan Boltzmann Law - Distribution of energy in Black body spectrum-Derivation of Newton's Law of Cooling from Stefan's Law - Solar constant	(12 Hrs)
UNIT-II	BEHAVIOUR OF REAL GASES Critical constants - Vander-walls equation of state – Estimation of Critical Constants - critical coefficient – Jule Thomson Porous Plug experiment - Joule Kelvin effect - Temperature of inversion - Liquefaction of air(Linde's Process) - Super conductivity	(12 Hrs)
UNIT- III	THERMODYNAMICS FIRST LAW AND SECOND LAW Thermodynamic system - Zeroth law of thermodynamics - work a path Dependent function - First law of thermodynamics- applications - Isothermal process - Adiabatic process - Isochoric process - Isobaric process - work done during an isothermal process and adiabatic process Reversible and Irreversible process –Heat engines-Carnot's Ideal Heat engine-Carnot's Cycle- Carnot's engine and refrigerator - Second law of thermodynamics-Carnot's theorem	(12 Hrs)
UNIT- IV	STATISTICAL BASIS OF THERMODYNAMICS Statistical Basis-Probability-Some Basic Rules of Probability Theory -Degrees of Freedom-Phase space- Entropy and Probability-The Equipartition of Energy-Maxwell Boltzman Energy Distribution Law –Application of Maxwell Boltzmann Distribution Law- Maxwell's Law of Distribution of Velocity	(12 Hrs)
UNIT- V	QUANTUM STATISTICS Need of Quantum Statistics - Bose Einstein Distribution Law- Photon Gas- Fermi-Dirac Distribution Law – Fermi level and Fermi Energy- Comparison of M-B, B-E and F-D Statistics.	(12 Hrs)

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	9	1	1	1	1
CLO 2	9	3	9	1	1	1	1
CLO 3	9	3	9	1	1	1	1
CLO 4	9	3	3	1	1	1	1
CLO 5	9	3	3	1	1	1	1
Weightage of the course	45	15	33	5	5	5	5
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	3	3	1	3
CLO 2	3	3	1	1	3
CLO 3	3	3	3	3	3
CLO 4	9	3	1	1	3
CLO 5	3	9	3	3	3
Weightage of the course	27	21	11	9	15
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Book

1. Heat and Thermodynamics and Statistical physics -Brijlal and Subramanyam, Hemne S.Chand & Company 2007.
Unit - I: Chapter – 15&8(15.1,15.9,15.11,15.13,15.14,15.19,8.12,8.13,8.21,8.26)
Unit - II: Chapter - 2&7 (2.1,2.8,2.10,2.12,2.21,2.24,7.8,7.19)
Unit - III:Chapter -4 (4.1,4.2,4.5,4.7,4.10,4.10.7,4.10.4,4.10.2, 4.10.3,4.12,4.13, 4.20,4.21, 4.23,4.24,4.26,4.28,4.29)
Unit - IV:Chapter – 9,10&11 (9.1,9.2,9.5,10.1,10.4,10.15,10.18,11.3,11.4,11.6)
Unit - V: Chapter- 12 (12.1,12.5,12.6,12.8,12.10,12.15)

Reference Books

1. Thermodynamics by J.P. Holman, McGraw - Hill Book Company, IV Edition
2. Thermodynamics and Statistical Mechanics, J. D. Gale and J. M. Seddon, Wiley-Interscience, New York (2002).
3. Thermodynamics, Kinetic Theory and Statistical Thermodynamics, F. W. Sears and G. L. Salinger, Addison-Wesley.

E-Resource

1. <http://www.authorstream.com/Presentation/SGPHY-4251886-thermodynamics-unit-widemann-franz-law/>
2. <http://www.authorstream.com/Presentation/SGPHY-4257605-black-body-spectrum-thermodynamics/>
3. <https://tccc.iesl.forth.gr/education/local/Labs-PC-II/2PA36JT.pdf>
4. <https://nptel.ac.in/content/storage2/courses/112105129/pdf/RAC%20Lecture%204.pdf>
5. <https://www.vedantu.com/physics/maxwell-boltzmann-distribution-derivation>
6. <http://www.jiwaji.edu/pdf/ecourse/physics/Comparison%20between.pdf>

DEPARTMENT OF PHYSICS

Programme: B.Sc., Physics, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – II
Course Title : OPTICS AND SOUND		
Course Code: 06CT22	Hours Per Week : 4	Credit: 4
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To gain knowledge about the optics and sound in order to

- Know about interference and its applications
- Study of diffraction and diffraction grating
- Understanding the polarization and its types
- Study of oscillation and its applications
- Understanding the properties of sound waves

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Know the basic concept of Total Internal Reflection, The Doppler effect, interference and its application	K1, K2,K3
CLO 2	Understanding the Diffraction, types and its application	K1, K2,K3
CLO 3	Define and applications of Polarization	K1, K2,K3
CLO 4	Applying the Oscillating systems to natural phenomena	K1, K2,K3
CLO 5	Discuss the Properties of Sound Waves	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	INTERFERENCE Total Internal Reflection - The Doppler Effect for Light - Two-Source Interference – Double-Slit Interference – Coherence - Intensity in Double-Slit interference - Michelson's interferometer	(12 Hrs)
UNIT-II	DIFFRACTION Diffraction and the Wave theory of Light – Single-Slit Diffraction - Intensity in Single-Slit Diffraction - Diffraction at a Circular Aperture - Double-Slit interference and diffraction combined – Multiple slits - Diffraction Gratings - Dispersion and Resolving power - X-ray Diffraction - Holography	(12 Hrs)
UNIT- III	POLARIZATION Polarization of Electromagnetic waves - Polarizing Sheets - Polarization by Reflection - Double Refraction - Circular polarization - Polarization by Scattering	(12 Hrs)
UNIT- IV	OSCILLATIONS Oscillating systems - The Simple Harmonic Oscillator - Simple Harmonic Motion - Energy in Simple Harmonic Motion - Applications of Simple Harmonic Motion - Simple Harmonic Motion and Uniform Circular motion - Damped Harmonic Motion - Forced Oscillations and Resonance - Two body Oscillations	(12 Hrs)
UNIT- V	SOUND WAVES Properties of Sound Waves - Travelling Sound Waves - The Speed of Sound - Power and Intensity of Sound Waves - Interference of Sound Waves - Standing longitudinal Waves - Vibrating Systems and Sources of Sound	(12 Hrs)

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	9	9	1	1	-	3
CLO 2	9	9	9	3	-	-	-
CLO 3	9	9	9	1	1	-	3
CLO 4	9	9	3	1	3	-	-
CLO 5	9	9	9	1	-	1	-
Weightage of the course	45	45	39	7	5	1	6
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	3	3	3	3
CLO 2	3	3	1	1	3
CLO 3	3	3	3	3	1
CLO 4	9	3	1	1	-
CLO 5	3	9	3	--	-
Weightage of the course	27	21	11	8	7
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Books

1. Physics, Volume 1, David Halliday, Robert Resnick, Kenneth S. Krane
Fifth Edition. John Wiley & Sons, Inc.
Unit IV: Chapter 17:17.1 - 17.9 Unit V: Chapters 19: 19.1 - 19.7
2. Physics Volume 2, David Halliday, Robert Resnick, Kenneth S. Krane.
Fifth Edition, John Wiley & Sons, Inc.
Unit I: Chapter 39:39.5, 39.6 Unit I: Chapter 41: 41.1 - 41.4, 41.6
Unit II: Chapter 42: 42.1 - 42.3, 42.5 Unit II: Chapter 43: 43.1 - 43.5
Unit III: Chapter 44:44.1, 44.2, 44.3, 44.4, 44.5, 44.6.

Reference Books

1. Physics for Scientists and Engineers with Modern Physics, Raymond A. Serway, Fourth Edition,
- Saunders College Publishing, 1995,
2. A Text Book of Physics, N. Subrahmanyam Brijlal, S.Chand & Company Ltd., 2003.
3. Optics, Sanjay Yadav, Krishna Nandan Kumar, Choice International publisher, 2007.
4. Optics, Ajoy Ghatak, Mc Graw Hill Education ltd, 2008.
5. A Text book of sound – N. Subrahmanyam and Brijlal, Vikas Publishing House, 2009

E-Resource

1. <https://byjus.com/physics/total-internal-reflection/>
2. <https://www.youtube.com/watch?v=vDvIhiCnatE>
3. <https://byjus.com/jee/youngs-double-slit-experiment/>
4. <https://www.rp-photonics.com/coherence.html>
5. <https://www.youtube.com/watch?v=lzBKlY4f1XA>

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6. <https://www.britannica.com/science/diffraction>
 7. <http://hyperphysics.phy-astr.gsu.edu/hbase/phyopt/grating.html>
 8. <https://www.edmundoptics.com/knowledge-center/application-notes/optics/introduction-to-polarization/>
 9. <https://www.youtube.com/watch?v=uLxDdQS0Tz8>
 10. <https://byjus.com/jee/oscillation/>
 11. <https://www.britannica.com/science/sound-physics>

DEPARTMENT OF PHYSICS

Programme: B.Sc., Physics, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Practical		Semester – II
Course Title : MAJOR PRACTICAL – I		
Course Code: 06CT23	Hours Per Week : 2	Credit: 2
CIA Marks : 40	ESE Marks : 60	Total Marks : 100

Preamble

To enable the students

- To develop the practical skills by applying the laws and concepts in physics experiments

Syllabus

1	Compound Pendulum- the value of acceleration due to gravity
2	Moment of Inertia using Bifilar Pendulum
3	Torsional Pendulum– Rigidity modulus and Moment of Inertia
4	Surface Tension & Interfacial Surface Tension by drops
5	Viscosity – Stokes method
6	Helmholtz Resonator– Relationship between the volume of air in a resonator and the fundamental frequency of its vibration.
7	Sonometer – Frequency of fork & Verification of Laws
8	Sonometer – Frequency of A.C.
9	Meld's Strings – Frequency of A.C.
10	Spectrometer – A & D
11	Spectrometer – i-d Curve
12	Spectrometer – Dispersive power of prism
13	Spectrometer – Grating -Normal incidence
14	Air wedge– Thickness of a wire
15	Newton's Rings– Radius of curvature
16	Young's Modulus – Uniform bending (Pin and Microscope method)
17	Young' Modulus – Non-Uniform Bending (Optic Lever, Scale and Telescope method)
18	Study of He-Ne laser

Text Books

1. A text book of Practical Physics – M.N. Srinivasan, S.Balasubramanian, R.Ranganathan, SultanChand & Sons, New Delhi, Reprint 2013

E-Resource

1. <https://physicsfeed.com/post/to-find-the-value-of-acceleration-due-to-gravity-g-radius-of-gyration-k- and-moment-of-inertia-i-by-using-compound-pendul/>
2. <https://www.youtube.com/watch?v=oYkBjEdtK1Q>
3. https://www.youtube.com/watch?v=QJd_OI7_UgM
4. <https://www.youtube.com/watch?v=bCS7KNM8mak>
5. https://www.brainkart.com/article/Viscosity-of-a-Liquid-By-Stoke---s-Method_36368/
6. <http://www.gcdataconcepts.com/helmholtz.html>

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7. <http://amrita.olabs.edu.in/?sub=1&brch=5&sim=227&cnt=2https://www.youtube.com/watch?v=1CyFsGk-14>
 8. <https://www.learnbse.in/to-find-the-frequency-of-the-ac-mains-with-a-sonometer/>
 9. <https://www.youtube.com/watch?v=oRch7irmLvo>
 10. <https://www.youtube.com/watch?v=gRRTEkJtNJ0>
 11. https://pgslogan.weebly.com/uploads/2/4/7/0/24706722/physics_lab_manual.pdf
 12. <http://depthome.brooklyn.cuny.edu/physics/lab/phy2/newlabs/Diffraction-grating-ver-2.pdf>
 13. <http://arunkumard.yolasite.com/resources/6%20Air%20Wedge.pdf>
 14. http://www.iiserpune.ac.in/~bhasbapat/phy221_files/NewtonsRing.pdf
 15. <http://arunkumard.yolasite.com/resources/3%20Young%27s%20Modulus%20Uniform%20Bending.pdf>
 16. <https://www.youtube.com/watch?v=XYwtOR13xPc>

DEPARTMENT OF CHEMISTRY

Programme: B.Sc.Physics, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: AEC		SEMESTER II
Course Title: CHEMISTRY FOR PHYSICIST-II		
Course Code: 07AEP2	Hours per week: 4	Credits: 4
CIA Marks: 25Marks	ESE Marks: 75 Marks	Total Marks: 100 Marks

Preambles

Students are enabled to,

- ✓ Gain knowledge on the composition and stability of the nucleus and types of nuclear reactions.
- ✓ Understand the basics of photochemistry, solid state chemistry and electrochemistry
- ✓ Learn the basic principles involved in organic chemistry

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Explain the composition and stability of the nucleus and types of nuclear reactions.	K1, K2 & K3
CLO 2	Define the laws of photochemistry and its applications	K1, K2 & K3
CLO 3	Familiar with the fundamental concepts of solid state chemistry	K1, K2 & K3
CLO 4	Comprehend the basic principles involved in electrochemistry	K1, K2 & K3
CLO 5	Explain the basics of organic chemistry and interpret the types of reactions and intermediates	K1, K2 & K3

K₁-Remembering

K₂-Understanding

K₃-Applying

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO5	PLO6	PLO7
CLO 1	3	1	1	1	1	1	3
CLO 2	3	1	1	1	1	1	3
CLO 3	3	1	1	1	1	1	3
CLO 4	3	1	1	1	1	1	3
CLO 5	3	1	1	1	1	1	3
weightage of the course	15	5	5	5	5	5	15

Mapping of CLO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CLO 1	3	1	1	1	1
CLO 2	3	1	1	1	1
CLO 3	3	1	1	1	1
CLO 4	3	1	1	1	1
CLO 5	1	3	1	1	3
Weightage of the course	13	7	5	5	7

Syllabus

UNIT-I: NUCLEAR CHEMISTRY

Introduction – mass defect, binding energy, packing fraction – Soddy's group displacement law – law of radioactivity – disintegration – nuclear fission - atom bomb – nuclear fusion - hydrogen bomb – applications of radioactivity in medicine, agriculture, industry and analytical fields – carbon dating.

UNIT-II: PHOTOCHEMISTRY

Definition of photochemical reactions – comparison of thermal and photochemical reactions – laws of photochemistry: Beer's law, Lamberts law - Grothus-Draper law, Stark Einstein law – quantum efficiency and its determination – consequences of light absorption by atoms and molecules – Jablonski diagram – chemiluminescence – bioluminescence – photosynthesis and photosensitization.

UNIT-III: SOLID STATE

Introduction – crystalline vs. amorphous solid – Terminology in solid state: isotropy, anisotropy, allotropy, polymorphism – unit cell, face and edge of crystal, interfacial angle, crystal lattice – symmetry elements – types of cubic system – Laws of Crystallography: law of constancy of interfacial angles, law of constancy of symmetry, law of rational indices – Miller indices – seven crystal system – Bravais lattices – Derivation and applications of Bragg's equation

UNIT-IV: ELECTROCHEMISTRY

Introduction – Faraday's law of electrolysis – cell constant – specific, equivalent and molar conductance – classification of electrolytes (strong and weak) – Kohlrausch's law – Arrhenius theory of electrolytic dissociation and its limitations – Ostwald's dilution law – electro chemical series – single electrode potential, sign convention. Reversible cells – derivation of Nernst equation – reference electrode, calomel electrode – commercial cells: primary, secondary cells, Leclanche cell Weston-cadmium cell, lead storage cells – fuel cells.

UNIT-V: ORGANIC BASIC PRINCIPLES

Electrophiles, nucleophiles and their types – types of organic reactions – substitution, addition, elimination, rearrangement, and polymerization (definition and examples only). homolytic and heterolytic fission – differences between homolytic and heterolytic cleavage – Intermediates: Formation and stability of carbocation, carbanion and free radical.

Text Books

1. Bahl, A., Bhal, B.S. and Tuli, G.D. *Essentials of Physical chemistry*, S. Chand Publishing Company, New Delhi, 2010.
2. Jain, M.K. and Sharma, S.C. *Modern Organic Chemistry*, 3rd Ed., Vishal Publishing Company, 2009.

Reference Books

1. Puri. B.R., Sharma L.R and Pathania, M. S. *Principles of Physical chemistry*, 30th Ed., Vishal publication, Jalandhar-Delhi, 2007.
2. Bahl, A. and Bahl, B.S. *Advanced Organic Chemistry*, S. Chand Publishing Company Ltd, New Delhi, 2012.
3. Kapoor, K. L., *A Text book of Physical Chemistry*, 4th Ed., McGraw Hill Education, 2017.

E - Resources

1. <https://www.youtube.com/watch?v=FU6y1XIADdg>
2. <https://www.youtube.com/watch?v=k6eCeWpjFwM>
3. <https://www.youtube.com/watch?v=Nmp6APGBtz0>
4. <https://www.youtube.com/watch?v=teTkvUtW4SA>
5. <https://www.youtube.com/watch?v=iIU4Lxs0cCo>

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Botany / B.Sc. Zoology/Physics (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: AEC		SEMESTER II
Course Title: VOLUMETRIC ESTIMATION		
Course Code: 07APP3	Hours per week: 2	Credits: 4
CIA Marks: 40 Marks	ESE Marks: 60 Marks	Total Marks: 100 Marks

Preamble

Students are enabled to

- ✓ Make solutions of different concentration and understand the principles behind volumetric analysis.
- ✓ Experience hands on training in volumetric titration

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO1	Anticipate, recognize, and respond properly to potential hazards in laboratory procedures	K1, K2 & K3
CLO2	Perform accurate quantitative measurements	K1, K2 & K3
CLO3	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO4	Keep accurate and complete experimental records	K1, K2 & K3
CLO5	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO6	Communicate effectively through oral and written reports	K1, K2 & K3

K₁-Remembering

K₂-Understanding

K₃-Applying

Mapping of CLO with PLO

	PO 1	PO 2	PO 3	PO 4	PO5	PO6	PO7
CLO 1	3	1	1	1	1	1	3
CLO 2	3	1	1	1	1	1	3
CLO 3	3	1	1	1	1	1	3
CLO 4	3	1	1	1	1	1	3
CLO 5	3	1	1	1	1	1	3
weightage of the course	15	5	5	5	5	5	15

Mapping of CLO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CLO 1	3	1	1	1	1
CLO 2	3	1	1	1	1
CLO 3	3	1	1	1	1
CLO 4	3	1	1	1	1
CLO 5	3	1	1	1	1
Weightage of the course	15	5	5	5	5

Syllabus

UNIT-I:

Concepts of molecular formula, molecular weight, equivalent weight, normality, molality, molarity and weight percentage – problems related to preparation of different concentrations of solutions – list of lab apparatus and their uses.

UNIT-II:

Principle of volumetric estimation – definitions of titration, standard solution, analyte, titrant, indicator, end point, equivalent point – primary standard and secondary standard – preparation of standard solution.

UNIT- III: ACIDIMETRY AND ALKALIMETRY

1. Estimation of Sodium Hydroxide
(Sodium carbonate vs. link Sulphuric acid vs. Sodium hydroxide)
2. Estimation of Sodium Carbonate
(Sodium hydroxide vs. link Hydrochloric acid vs. Sodium carbonate)
3. Estimation of Sulphuric acid
(Oxalic acid vs. link Sodium Hydroxide vs. Sulphuric acid)
4. Estimation of Hydrochloric acid
(Oxalic acid vs. link Sodium Hydroxide vs. Hydrochloric acid)

UNIT-IV: REDOX TITRATIONS: PERMANGANOMETRY

1. Estimation of Oxalic acid
(Ferrous sulphate vs. link Potassium Permanganate vs. Oxalic acid)
2. Estimation of Potassium permanganate
(Sodium hydroxide vs. link Oxalic acid vs. Potassium Permanganate)
3. Estimation of Ferrous sulphate
(Oxalic acid vs. link Potassium Permanganate vs. Ferrous sulphate)
4. Estimation of Ferrous Ammonium sulphate
(Ferrous sulphate vs. link Potassium Permanganate vs. Ferrous Ammonium sulphate)

UNIT-V: DICHROMETRY

1. Estimation of Potassium dichromate
(Potassium Permanganate vs. link Ferrous Ammonium sulphate vs. Potassium dichromate)

Text Book

1. Venkateswaran, V., Veerasamy, R. and Kulandaivelu, A.R. *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand and Sons, New Delhi, 2017.
2. Thomas, A.O, B.Sc. *Main Practical Chemistry*, Scientific Book Centre, Cannanore, 2003.
3. Jeffery, G.H., Basset, J. and others, *Vogel's Textbook of Quantitative Chemical Analysis*, ELBS, 5th Ed., London, 1989.

Reference Books

1. Gnanaprakasam, N.S. and Ramamurthy, G. *Organic Chemistry Lab Manual*, S.Viswanathan Pvt. Ltd, 2007.
2. Pass, G. and Sutcliffe, H. *Practical Inorganic Chemistry*, 2nd Ed., Chapman & Hall Ltd, London, 1979.

E - Resources

1. <https://www.youtube.com/watch?v=KyZtyEF6kqk>
2. <https://www.youtube.com/watch?v=ka62KfMgRv8>
3. <https://www.youtube.com/watch?v=hxYorBeMhnc>
4. <https://www.youtube.com/watch?v=xOQ6tweyWuE>
5. <https://www.youtube.com/watch?v=bHkFSavcU5I>

Distribution of marks

		Max marks: 100	
Internal	: 40 marks	External	: 60 marks
Attendance	: 10 marks	Estimation	: 40 marks
Laboratory performance and model practical	: 20 marks	Simple procedure	: 10 marks
Observation note book	: 10 marks	Record note book	: 10 marks
Total	: 40 marks	Total	: 60 marks

For Volumetric Estimation if the student have Less than 2% Error - 40 marks

- 2-3% Error - 35 marks
- 3-4% Error - 30 marks
- 3-5% Error - **25 Marks**
- Greater than 5% - 20 marks

DEPARTMENT OF PHYSICS

Programme: B.Sc., Physics, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part IV : GEC		Semester – II
Course Title : ELECTRICAL HOME APPLIANCES		
Course Code: 06GE21	Hours Per Week : 2	Credit: 2
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

The students to gain knowledge about electrical home appliances in order to

- ❖ Learn the basic principles, theory and concepts of various power supplies
- ❖ Differentiate the Alternating current and Direct current supply and the function of Transformers
- ❖ Learn and working principles of various electric lamps and its uses
- ❖ Enable the electric heaters, various types and its uses
- ❖ Gain the knowledge about the electrical gadgets like mixi, grinder, iron box and fans

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Understanding the basic principles, theory and concepts of power supplies	K1,K2 & K3
CLO 2	Know the Differentiate between A.C and D.C supply and function of Transformers	K1,K2 & K3
CLO 3	Gain knowledge in order to electric lamps and its uses	K1,K2 & K3
CLO 4	Understanding the concept of various electric heaters and its uses	K1,K2 & K3
CLO 5	Know all the electrical appliances and its uses	K1,K2 & K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	POWER SUPPLIES-I Alternating current (AC) Supply – Phase – Neutral – Earth connection – Single Phase – Two Phase – Three Phase supply – Direct current (DC) supply	(6 Hrs)
UNIT-II	POWER SUPPLIES-II & TRANSFORMER Difference between Alternation current (AC) and Direct current (DC) - Stabilized power supply – Alternating current (AC) adopter – Transformer – Types – Choke – Uses	(6Hrs)
UNIT- III	ELECTRIC LAMPS Electric lamps – Incandescent lamp – Fluorescent lamp – Mercury and Sodium vapour lamp – Halogen lamps – Different colours – Compact Fluorescent Lamp (CFL) – Light Emitting Diode (LED) – Seven segment display	(6 Hrs)
UNIT- IV	ELECTRIC HEATERS Electric heaters – Water heaters – Gaiser heater – Instant water heater – Immersion rod heater	(6 Hrs)
UNIT- V	ELECTRIC APPLIANCES Mixi – Grinder – Electric iron box – Electric fan (Table and Ceiling fans) – Speed control using regulators in fan	(6Hrs)

Text Book

Material prepared by Department of Physics, Vivekananda College

Reference Book

1. Basic Electricity – Van Vakkenburgh, Nooger & Neville, Publisher- Van Nostrand Reinhold Company – London.
2. Basic electrical engineering, M.L.Anwani, Dhanpat Rai and Company, Delhi, 2003

E-Resource

1. [https://www.electrical4u.com/what-is-transformer-definition-working-principle-of-transformer/#:~:text=A%20transformer%20is%20defined%20as,\)%20voltage%20levels%20between%20circuits.](https://www.electrical4u.com/what-is-transformer-definition-working-principle-of-transformer/#:~:text=A%20transformer%20is%20defined%20as,)%20voltage%20levels%20between%20circuits.)
2. <https://byjus.com/physics/difference-between-ac-and-dc/>
3. <https://www.energiguide.be/en/questions-answers/what-is-meant-by-single-phase-or-three-phase-connection/1933/>
4. <https://circuitglobe.com/difference-between-single-phase-and-three-phase.html>
5. <https://www.electrical4u.com/lamps-types-and-performance-comparison/>
6. <https://www.allaboutcircuits.com/textbook/digital/chpt-4/switch-types/>

விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு-625 243
தமிழ்த்துறை

Programme: B.A., B.Sc. (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 2022 and after)

PART – I TAMIL		SEMESTER : III
Course Title : : காப்பிய இலக்கியமும் உரைநடை இலக்கியமும்		
Course Code : P1LT31	Hours per week : 6	Credits : 3
A : 25 Marks	E : 75 Marks	tal: 100 Marks

முன்னுரை

1. வாழ்க்கையின் உறுதிப்பொருள்களான அறம், பொருள், இன்பம் வீடுபேறு ஆகியனவற்றை உணர்த்துதல்.
2. இறைவழிபாட்டு சிந்தனைகளை வளர்த்தல்.
3. உரைநடை இலக்கியத்தின் வாயிலாக தனிமனித ஒழுக்க நிலைகளை எடுத்துக்காட்டல்.
4. மரபுக்கவிதைகளின் வகைமைகளை அறிதல்.
5. காப்பியம் மற்றும் உரைநடை இலக்கியத்தின் வரலாற்றினை அறிவித்தல்.

பாடதிட்டத்தின் முடிவுகள்

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

NO.	ஊழரசளந முரவஉமுஅந	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	காப்பிய இலக்கியங்களின் வாயிலாக அறம், பொருள், இன்பம், வீடுபேறு என்ற வாழ்க்கையின் உறுதிப்பொருட்கள், எவ்வுயிரையும் தம்முயிர்போல மதித்தல், பிறர் மனை நோக்கா நிலை, பகைமை பாராட்டாத தன்மை, ஆணவம் இல்லா வாழ்க்கை போன்றவைகளை வரையறை செய்த தன்மைகளை உணர்த்துதல்.	K1, K2
CLO 2	மரபு இலக்கணங்களான அணிகள், பாவகைகளின் வாயிலாக மாணவர்களின் இலக்கியச்சுவை உணர்வினை வளர்த்து, கற்பனைத் திறன்களை அறிவித்தல்.	K2, K3
CLO 3	உரைநடை இலக்கியங்களின் வாயிலாக இறைவழிபாட்டுச் சிந்தனைகளை தனிமனித வாழ்க்கை நிகழ்வுகளின் வழி வெளிப்படுத்தி, உலக இயல்புகளை மொழிந்து, பரம்பொருளை அடையக்கூடிய வழிவகைகளையும், சமரச சன்மார்க்க நெறிகளையும் தெளிவுறுத்துதல்.	K2, K3
CLO 4	புராண, இதிகாசங்களின் வழி அக்காலகட்டமக்களின் சமூக நிலைகளைக் கலந்துரையாட செய்தல்.	K2
CLO 5	காப்பியம் மற்றும் உரைநடை இலக்கியம் தோன்றிய காலகட்ட வரலாற்றினை விவரித்தல். கணினிக்கு தமிழ் அறிமுகமான நிலைகள், அதற்குப் பயன்படுத்தக் கூடிய கணினித் தமிழ்ச்சொற்கள் ஆகியன குறித்து விவரித்தல்	K1, K2, K3

K₁-Remembering

K₂-Understanding

K₃-Applying

பாடதிட்டம்

அலகு - 1	காப்பிய இலக்கியம் 1. சிலப்பதிகாரம்-(கனாத்திறம் உரைத்த காதை) 2. மணிமேகலை (ஆதிரை பிச்சையிட்ட காதை) 3. சீவகசிந்தாமணி (குணமாலையார் இலம்பகம்)	18மணிநேரம்
அலகு - 2	இதிகாச இலக்கியம் 1. கம்பராமாயணம் (குகப்படலம்) 2. மகாபாரதம் (கண்ணன் தூதுச் சருக்கம்) 3. ஸ்ரீகந்த புராணம் - தேவகாண்டம் (தெய்வானை, வள்ளி திருமணம்)	
அலகு - 3	உரைநடை இலக்கியம் 1. சித்பவானந்த சிந்தனைகள்	18மணிநேரம்
அலகு - 4	தமிழ் இலக்கணம் 1.அணிகள் - உவமை - உருவகம் - பிறிது மொழிதல் - தற்குறிப்பேற்றம் - வஞ்சப்புகழ்ச்சி அணி 2.பாவகைகள் - வெண்பா - ஆசிரியப்பா 3.மடல் வரைதல் - விண்ணப்பம் - புகார்க் கடிதம் -	18மணிநேரம்

	பாராட்டுக் கடிதம்	
அலகு - 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத் தமிழும் 1. காப்பிய இலக்கிய வரலாறு 2. உரைநடை இலக்கிய வரலாறு 3. செய்தித்தாள் தொடங்கும் வழிமுறைகள் செய்தித்தாளின் நிர்வாக அமைப்பு- பேட்டி	18மணிநேரம்

பாட நூல்கள்

1. தமிழ்ச் செய்யுட் தொகுப்பு - தமிழ்த்துறை வெளியீடு
2. நாடகம் - வைகையில் வெள்ளம் வரும் - சேதுபதி.
பாவை பள்ளிகேஷன்ஸ் - சென்னை - 14.

பார்வை நூல்கள்

- 1.தமிழ் இலக்கிய வரலாறு - பேரா.முனைவர் பாக்கியமேரி,
நியூ செஞ்சரி புக் ஹவுஸ்(பி)லிட்,41-பி, சிட்கோ இண்டஸ்ட்ரியல் எஸ்டேட்,
அம்பத்தூர், சென்னை- 600 098.
- 2.தமிழ் இலக்கிய வரலாறு- மு.வரதராசனார்
சாகித்திய அக்காதெமி,தலைமை அலுவலகம்,ரவீந்திர பவன்,
35,பெரோஸ்ஷா சாலை,புதுதில்லி.

E-Resources

1. <https://www.youtube.com/watch?v=JRkZ1W4V7e4>
2. <https://www.youtube.com/watch?v=svvgz4Bt3Vo>
3. <https://www.youtube.com/watch?v=PSG4fuuHruo>
4. <https://www.youtube.com/watch?v=yFGkSYyhsRA>
5. https://www.tamildigitallibrary.in/admin/assets/book/TVA_BOK_0002569_%E0%AE%B5%E0%AE%BF%E0%AE%B2%E0%AF%8D%E0%AE%B2%E0%AE%BF%E0%AE%AA%E0%AF%81%E0%AE%A4%E0%AF%8D%E0%AE%A4%E0%AF%82%E0%AE%B0%E0%AE%BE%E0%AE%B0%E0%AF%8D_%E0%AE%AA%E0%AE%BE%E0%AE%B0%E0%AE%A4%E0%AE%AE%E0%AF%8D.pdf
6. <https://www.youtube.com/watch?v=Oa7RKkVyVHA>
7. <http://www.shakthibharathi.com/uploads/%E0%AE%95%E0%AE%BE%E0%AE%AA%E0%AF%8D%E0%AE%AA%E0%AE%BF%E0%AE%AF%20%E0%AE%87%E0%AE%B2%E0%AE%95%E0%AF%8D%E0%AE%95%E0%AE%BF%E0%AE%AF%20%E0%AE%B5%E0%AE%B0%E0%AE%B2%E0%AE%BE%E0%AE%B1%E0%AF%81.pdf>
8. https://www.gunathamizh.com/2020/05/blog-post_30.html

Mapping of CLO and PLO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	9	9	9	9	3	9
CLO2	9	9	9	9	9	3	9
CLO3	9	9	9	9	9	3	9
CLO4	9	3	3	3	9	-	9
CLO5	9	3	9	9	9	-	9
Weightage of the course	45	33	39	39	45	09	45

DEPARTMENT SANSKRIT

Programme: B.A./ B.Sc. (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

PART – I : Sanskrit		SEMESTER – III
Course Title : PROSE, POETICS AND HISTORY OF SANSKRIT LITERATURE –III		
Course Code: P1LS31	Hours per week: 6	Credits: 3
CIA Marks: 25 Marks	ESE Marks: 75 Marks	Total Marks: 100 Marks

Preamble:

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first four semesters the above column explains the scheme of the III semester.

Course Outcomes (COs)

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

Number	Statement	Knowledge Level
CLO 1	Understand the important aspects of prose literature	K2
CLO 2	Discriminate spirituality in Literature	K2
CLO 3	Basic knowledge of Sanskrit poetics	K1
CLO 4	Describe and defend history of early Sanskrit literature	K2
CLO 5	Practice Creativity and Demonstrate various culture of world	K2, K3

K1-Knowledge**K2-Understand****K3-Apply****Syllabus**

Unit 1: Prose -Gurubhakti, poetics –Upamā, Ullekhā. History of Sanskrit Literature – Gadya Kāvya- introduction to Gadya Kāvya- structure of Gadya Kāvya- Kathā and Ākhyāyikā

Unit 2: Prose –Śukānasopadeśa, poetics –Rūpaka, Apahnuti. History of Sanskrit Literature – Daśakumāracaritam of Daṇḍin, Vāsavadatta of Subandhu. Popular tales

Unit 3: Prose - Samsargajādasagunābhavanti, poetics –Utpreksā, Atīśayokti. History of Sanskrit Literature- Kādambarī of Bāṇabhaṭṭa- structure of Kādambarī. Historical Kāvya- Harṣacaritam of Bāṇabhaṭṭa.

Unit 4: Prose - Pañcatantra (introduction), poetics –Dīpaka, Arthāntaranyāsa. History of Sanskrit Literature- works of Vākpati, Bilhana, Kalhana, Vāmananabhaṭṭabāṇa.

Unit 5: Prose –Vāsudevadautyam, poetics – Śleṣa, Vyatireka. History of Sanskrit Literature- History of Campū-literature – works of Trivikramabhaṭṭa, Somadeva, Bhoja, Abhinavakālidāsa, Anantabhaṭṭa, Cidamarakavi, Rājāśarabhoji, Nīlakaṇṭhadīkṣita, Veṅkaṭādri.

Mapping of CO and PO

	PLO1	PLO 2	PLO3	PLO4	PLO5	PLO 6	PLO 7
CLO1	9	9	9	3	9	-	9
CLO2	9	9	9	9	3	-	3
CLO3	3	3	9	9	9	1	3
CLO4	9	9	9	9	9	-	9
CLO5	9	9	9	9	3	-	3
	39	39	45	39	33	1	27

Strong -9

Medium -3

Low -1

Text Book(s)

1. Sāhityarasakāṇa, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai - 625010. Year of publication 1996.
2. A History of Sanskrit Literature, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai -625010. Year of publication 1996.

Reference Books

1. A Short History of Sanskrit Literature, by T.K. Ramachandra Aiyar, published by R.S. Vadhyar & Sons, Kalpathi, Palakkad -678003
A History of Sanskrit Literature, by A. Berriedale Keith, published by Mothilal Banarsidass Publishers Private Limited, Delhi, 2017

DEPARTMENT OF ENGLISH**Programme: B.A., & B.Sc., (Under CBCS and LOCF)**

(For those students admitted during the Academic Year 2021-22 onwards)

PART – II : English		SEMESTER – III
Subject Title : ENGLISH FOR ACADEMIC EXCELLENCE AND SUCCESS		
Course Code: P2LE31/P2CE31	Hours per week: 6	Credit: 3
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble:

The students are expected to inculcate English language proficiency and its socio-linguistic competency.

Course Outcome (CO):

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

No	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO1	Develop comprehension skills of poetic diction/usage through the poetry	K1, K2, K3
CLO2	Appraise various authors' socio-linguistic values through the prose discourses	K1, K2, K3
CLO3	Critique the views of the author, and characters from their discourses found in the novel	K1, K2, K3
CLO4	Examine the properties of listening, speaking, reading, and writing activities to enhance English grammar usages	K1, K2, K3
CLO5	Exercise LSRW skills	K1, K2, K3

K1-Remembering**K2– Understanding****K3 –Applying****Mapping of CO and PO**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CLO1	9	9	9	3	9	3	9
CLO2	9	9	9	9	9	-	9
CLO3	9	9	9	9	9	3	9
CLO4	9	9	3	-	-	-	9
CLO5	9	9	9	3	3	-	9
	45	45	39	24	30	06	45

Strong-9**Medium -3****Low -1****Unit-1 Poetry**

1. *The Soul's Prayer* – Sarojini Naidu
2. *La Belle Dame Sans Merci* – John Keats
3. *The Lotus* – Toru Dutt

Unit-2 Prose

1. *Women Not the Weaker Sex* – Mahatma Gandhi
2. *The Lady, or the Tiger?* – Frank R. Stockton
3. *Educating the Adult* (Chapter-I) *The Indian National Education* – Swami Chidbhavananda

Unit-3 Novel

Oliver Twist – Charles Dickens [Abridged]
(For the three Continuous Internal Assessment [CIA] Tests)

Unit-4 Grammar

1. Active Voice and Passive Voice
2. Direct Speech and Indirect Speech
3. Sentence Connectors and Linkers

Unit-5 Oral & Written Communication

1. **Listening** – Comprehension practice from Poetry, Prose, Novel/Online Voice Practice, observing/viewing E-content (with subtitles), Guest/Invited Lectures, Conference/Seminar Presentations & Tests, and DD National News Live, BBC, CNN, VOA etc
2. **Speaking** – In Group Discussion Forum, participate in the Turn Taking, and Conversation Management, Debating, Defending/Mock Viva-Voice, Seminar Presentations on Classroom-Assignments, and Peer-Team-interactions/AIF in Class-room
3. **Reading** – Different Reading Strategies in Poetry, Prose, Novel, Newspaper etc
4. **Writing** – *Dialogue/Conversation Writing, Advertisement Writing, and Creative Writing (autobiography, article etc.) for publication in Mass Media.**

Text Books

1. Vinay Harwadker, and A.K.Ramanujan, ed. *The Oxford Anthology of Modern Indian Poetry*. New Delhi: OUP, 1994. (or)
The Norton Anthology English Literature. New York/London: W.W.Norton, 2012. (or)
Dr.M.Moovendhan, ed. *Wings of Poesy*. Chennai: Thamarai Publications, 2018 (or)
2. <<https://www.poemhunter.com/poem/the-soul-s-prayer/>>
3. <[https://en.wikisource.org/wiki/The_Bengali_Book_of_English_Verse/The_Lotus_\(Toru_Dutt\)](https://en.wikisource.org/wiki/The_Bengali_Book_of_English_Verse/The_Lotus_(Toru_Dutt))>
4. <<https://www.poetryfoundation.org/poems/45392/ulysses>>
5. Swami Chidbhavananda. *The Indian National Education*. Tirupparathurai: Sri Ramakrishna Tapovanam, 2017.
<http://www.rktapovanam.org/book_details.php?book_id=MjE=>
6. Dr.P.C. James Daniel, ed. *Gateway to English: An Anthology of Prose*. Chennai: Harrows Publications, 2018.
7. Abhijit Acharjee, and Rakesh Ramamoorthy, ed. *Frontiers of Communication: An Anthology of Short Stories and Prose*. Chennai: Cambridge University Press, 2018.
8. Charles Dickens. *Oliver Twist*. Chennai: Nestling Books, 2018. (or)
9. Charles Dickens. *Oliver Twist (the Parish Boy's Progress)*. London: Richard Bentley, 1839.
<https://ia800204.us.archive.org/34/items/olivertwist01dickrich/olivertwist01dickrich.pdf>
10. Michael Swan and Catherine Walter. *How English Works: A Grammar Practice Book*. Oxford: OUP, 1997. (or) Wren and Martin. *High School English Grammar and Composition*. New Delhi: S.Chand & Company LTD.1935.
11. Owen Hargie, David Dickson, and Dennis Tourish. *Communication Skills for Effective Management*. New York: Palgrave Macmillan, 2004. (or)
12. British Council | LearnEnglish<<https://learnenglish.britishcouncil.org/skills>>
13. BBC News <<https://www.bbc.com/news>> VOA LearningEnglish
14. <<https://learningenglish.voanews.com/>>
15. University Grants Commission (UGC), New Delhi <<https://www.ugc.ac.in/subpage/EContent-URL.aspx>> British Council | LearnEnglish<<https://www.youtube.com/channel/UCOtnu-KKoAbN47IuYMeDPog>> Cambridge Assessment English<<https://www.cambridgeenglish.org/test-your-english/>>
16. CLIL (Content & Language Integrated Learning) – Module by TANSCHÉ
NOTE: (Text: Prescribed chapters or pages will be given to the students by the department and the college)

Reference Books

1. Eileen Thompson et al. *Prentice Hall Literature: The English Tradition*. 2.Ed. New Jersey: Prentice-Hall Inc., 1989. (or) John Pfordresher et al. *England in Literature*. Illinois: Scott, Foresman & Co., 1989.
2. Swami Chidbhavananda. *Vedanta Society*.<<https://sfvedanta.org/authors/swami-chidbhavananda/>>
3. Dr.A.Shanmugakani, ed. *Prose for Communication: An Anthology of Prose*. Madurai: Manimekala Publishing House, 2008.
4. Charles Dickens. *Oliver Twist*. London: Wordsworth Classic, 1992.
5. J. C.Nesfield. *Manual of English Grammar and Composition*. London: Macmillan, 1908.

6. John Eastwood. *Oxford Practice Grammar*. Oxford: OUP, 1945.
7. Dennis Freeborn. *A Course Book in English Grammar*. London: Macmillan, 1987.
8. K.V.Joseph. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.
9. J. Thomson, and A. V. Martinet. *A Practical English Grammar*. New Delhi: OUP, 1986.
10. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.
11. Edgar Thorpe, and Showick Thorpe. *Objective English for Competitive Examinations*. New Delhi: Pearson India Education, 2017.
12. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.

E Resources and References

Unit-1 Poetry

<https://www.sajeepedia.com/naidus-the-souls-prayer/>
<https://www.criticalbuzz.co.in/critical-analysis-of-the-souls-prayer-by-sarojini-naidu/>
<https://www.poetryfoundation.org/articles/69748/john-keats-la-belle-dame-sans-merci>
<https://www.cliffsnotes.com/literature/k/keats-poems/summary-and-analysis/la-belle-dame-sans-merci-original-version>
<https://www.literaturewise.in/mdl/mod/page/view.php?id=142>
<https://www.slideshare.net/stmaryspg2014/the-lotus-toru-dutt>

Unit-2 Prose

<https://degmateng.wordpress.com/2017/03/31/unit-2-prose-ls-1-women-not-the-weaker-sex-m-k-gandhi/>
<https://www.mkgandhi.org/momgandhi/chap60.htm>
<https://www.eastoftheweb.com/short-stories/UBooks/LadyTige.shtml>
<https://www.supersummary.com/the-lady-or-the-tiger/summary>
<https://www.slideshare.net/BharathiRaja6/part2-english-educating-the-adult-chapteri-taken-from-indian-national-education-written-by-srimath-swami-chidbhavananda>

Unit-3 Novel

<https://www.booksummary.net/oliver-twist-charles-dickens/>
<https://www.cliffsnotes.com/literature/o/oliver-twist/character-list>
https://www.studypool.com/studyGuides/Oliver_Twist/Themes#:~:text=Oliver%20Twist%20is%20a%20story,all%20the%20obstacles%20between%20them.

Unit-4 Grammar

<https://www.edudose.com/english/active-and-passive-voice-rules/>
<https://www.perfect-english-grammar.com/reported-speech.html>
<https://linguapress.com/grammar/conjunctions.htm>

Unit-5 Oral & Written Communication

<https://content.byui.edu/file/b8b83119-9acc-4a7b-bc84-efacf9043998/1/Writing-2-5-2.html>
<https://www.towson.edu/careercenter/students/careerskills/communication.html>
<https://www.slideshare.net/shahbaazahmed15/bc-communication>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – III
Course Title : PRINCIPLES OF ELECTRIC CIRCUITS		
Course Code: 06CT31	Hours Per Week : 4	Credit: 4
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To enable the students to

- ❖ Understanding the fundamentals of different combinations of resistive circuits and network theorems
- ❖ Familiarize of network conversion
- ❖ Applying the circuit theorems in electric circuits both in dc and ac
- ❖ Study the phasors and complex numbers in ac circuit
- ❖ Analyze the RC and RL networks for sine waves

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Know the different combinations of resistive circuits and network theorems	K1, K2,K3
CLO 2	Understanding the concept of alternating current and voltage and complex numbers	K1, K2,K3
CLO 3	Analyse the RC circuit for ac	K1, K2,K3
CLO 4	Analyse the RL circuit for ac	K1, K2,K3
CLO 5	Analyse and Applying ac to RLC resonance and passive filters	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I:	SERIES PARALLEL COMBINATIONS AND CIRCUIT THEOREMS CONVERSIONS: Identifying series- parallel relationships - Analysis of series-parallel circuit – voltage dividers with resistive loads – loading effect of a voltmeter – ladder networks – The wheatstone bridge – The DC voltage source – The current source – Source conversion – The super position theorem – Thevinin's theorem – Norton's theorem –maximum power transfer theorem – Delta to Wye(Δ -Y) and Wye to delta (Y- Δ) conversion.	(12 Hrs)
UNIT-II:	AC CHARACTERISTICS AND ANALYSIS: The sinusoidal waveforms – sinusoidal voltage and current values – angular measurement of a sine wave – the sine wave formula – Introduction to phasors – analysis of AC circuits - Non sinusoidal waveforms – The oscilloscope – The complex number system.	(12 Hrs)
UNIT- III:	RC CIRCUIT ANALYSIS: sinusoidal response of RC circuits – Impedance of a series RC circuit – Analysis of series of RC circuits - Impedance of a parallel RC circuits – Analysis of parallel RC circuits –analysis of Series-parallel RC circuits – Power in RC circuits – Basic applications.	(12 Hrs)

UNIT- IV:	RL CIRCUIT ANALYSIS : sinusoidal response of RL circuits – Impedance of a series RL circuit – Analysis of series of RL circuits - Impedance of a parallel RL circuit – Analysis of parallel RL circuits –analysis of Series-parallel circuits – Power in RL circuits – Basic applications.	(12 Hrs)
UNIT- V:	RLC CIRCUITS AND RESONANCE AND PASSIVE FILTERS: Impedance of series RLC circuits – analysis of RLC circuits – series resonance – impedance of parallel RLC circuits – analysis of parallel RLC circuits – parallel resonance - Low-pass filters – high-pass filters – Band-pass filters – Band-stop filters	(12 Hrs)

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	1	9	3	3	1	3
CLO 2	9	3	9	3	9	3	1
CLO 3	9	1	9	3	9	3	1
CLO 4	9	1	9	3	9	3	1
CLO 5	9	3	9	3	9	3	3
Weightage of the course	45	9	45	15	45	13	9
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	9	9	9
CLO 2	9	9	9	9	9
CLO 3	9	9	9	9	9
CLO 4	9	9	9	9	9
CLO 5	9	9	9	9	9
Weightage of the course	45	45	45	45	45
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Books

1. **Principles of Electric Circuits**, Thomas L. Floyd, Pearson Education Ltd, 9th Edition, 2016.

UNIT-I Chapter 7 : 7.1 to 7.5

Chapter 8 : 8.1 to 8.8

UNIT-II Chapter 11 : 11.1 to 11.6 and 11.9 to 11.10

Chapter 14 : 14.1

UNIT-III Chapter 14 : 14.2 to 14.10

UNIT-IV Chapter 15 : 15.1 to 15.8

UNIT-V Chapter 16 : 16.1 to 16.6

Chapter 17 : 17.1 to 17.4

Chapter 18 : 18.1 to 18.6

Reference Books

- 1) **Electronics Devices and Circuits** – S. Salivahanan, N.Suresh Kumar, A.Vallavaraj, Tata McGraw-Hill Publishing company Ltd, Fifteenth Edition, 2015.
- 2) **Electronic Circuit Analysis** – U.A.Bakshi, A.V.Bakshi, Technical Publications,2013.

E-Resource

1. <https://nptel.ac.in/courses/108/102/108102042/>
2. <https://nptel.ac.in/courses/108/105/108105159/>
3. <https://nptel.ac.in/noc/courses/noc14/SEM2/noc14-ec01/>
4. <https://nptel.ac.in/courses/117/106/117106108/>
5. <https://www.digimat.in/nptel/courses/video/108102097/L21.html>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – III
Course Title : SPECTROSCOPY		
Course Code: 06CT32	Hours Per Week : 4	Credit: 4
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To enable the students to

- ❖ Understanding the developments leading to various atom models.
- ❖ Explain the role of different quantum number and electron spin in atomic phenomena
- ❖ Enable students to learn microwave spectroscopy
- ❖ Familiarize the basic concept of IR spectroscopy
- ❖ Acquire the knowledge of Raman spectroscopy

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Know the basic concepts of various atom models	K1, K2, K3
CLO 2	Understanding the different quantum numbers and dipole moments	K1, K2, K3
CLO 3	Analyse the rotational spectrum of various types of molecules	K1, K2, K3
CLO 4	Applying infrared spectroscopy to harmonic and anharmonic oscillators	K1, K2, K3
CLO 5	Analyse and Applying Raman spectroscopy to various types of molecules	K1, K2, K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	ATOM MODELS Introduction-Rutherford experiment on scattering of α – particles- Bohr atom model-Effect of nuclear motion on atomic spectra-Evidences in favour of Bohr's theory-Correspondence principle – Critical potentials-Atomic excitation-Experimental determination of critical potentials – The Vector atom model	(15 Hrs)
UNIT-II	QUANTUM NUMBERS AND COUPLING SCHEMES Quantum numbers associated with the Vector atom model-Coupling schemes-The Pauli exclusion principle-Magnetic dipole moment due to orbital motion of the electron- Magnetic dipole moment due to Spin-The Stern and Gerlach experiment-Spin-Orbit coupling – Optical spectra-Zeeman effect –Larmor's theorem-Anomalous Zeeman effect-Stark effect.	(15 Hrs)
UNIT- III	MICROWAVE SPECTROSCOPY The Rotation of Molecules-Rotational Spectra-The Rigid Diatomic Molecule-The Intensities of Spectral Lines-Linear Molecules-Symmetric Top Molecule-Asymmetric Top Molecules-Techniques and Instrumentation-Chemical Analysis By Microwave Spectroscopy-The Microwave oven.	(10 Hrs)

UNIT- IV	INFRA-RED SPECTROSCOPY The Energy of a Diatomic Molecule-The Simple Harmonic Oscillator-The Anharmonic Oscillator-The Diatomic Vibrating Rotator-Techniques and Instrumentation-(Outline, Double and Single Beam Operation only).	(10 Hrs)
UNIT- V	RAMAN SPECTROSCOPY Introduction – Quantum Theory of Raman Effect-Classical Theory of the Raman Effect (Molecular Polarizability)-Linear Molecules - Symmetric Top Molecules –Spherical Top Molecules:Asymmetric Top Molecules-Techniques and Instrumentation.	(10 Hrs)

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	9	1	3	1	1
CLO 2	9	3	9	1	3	1	1
CLO 3	9	3	9	1	1	1	1
CLO 4	9	3	9	1	1	1	1
CLO 5	9	3	3	1	1	1	1
Weightage of the course	45	15	30	5	9	5	5
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	9	3	3
CLO 2	9	9	9	3	3
CLO 3	9	9	9	3	9
CLO 4	9	3	9	3	9
CLO 5	9	3	9	3	9
Weightage of the course	45	33	45	15	33
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Books

- MODERN PHYSICS**, R.Murugesan & Kiruthiga Sivaprasath, S.Chand & Company Ltd, New Delhi. 2014.
UNIT-I - Chapter 6: 6.1, 6.2, 6.4 to 6.10 and 6.12
UNIT-II-Chapter 6: 6.13 to 6.15, 6.18 to 6.24 and 6.26 and 6.28
- FUNDAMENTALS OF MOLECULAR SPECTROSCOPY**, N.BANWELL and M.McCASH, Tata McGRAW HILL Publishing Company, New Delhi, 2007
UNIT-III-Chapter 2: 2.1, 2.2, 2.3.1, 2.3.2, 2.4.1, 2.4.2, 2.4.3, 2.5, 2.6 and 2.7
UNIT-IV-Chapter 3: 3.1.1, 3.1.2, 3.1.3, 3.2, 3.8, 3.8.1 and 3.8.2
UNIT-V- Chapter 4: 4.1, 4.1.1, 4.1.2, 4.2.1, 4.2.2, 4.2.3 and 4.6

Reference Books

- 1) Atomic Physics, J.B. Rajam, S.Chand & Company Ltd, New Delhi, 2008.
- 2) Fundamentals of Molecular Spectroscopy, Colin N. Banwell and Elaine M.McCash, Tata McGraw-Hill Publishing Company Ltd., New Delhi 2013.
- 3) Molecular Structure and Spectroscopy, G. Aruldas, Printice Hall of India Publication, 2005.

E-Resource

1. <http://www.rnlkwc.ac.in/pdf/study-material/chemistry/C14%5BC. N. Banwell%5D Fundamentals of Molecular Spectroscopy SRC.pdf>
2. <http://cdac.olabs.edu.in/?sub=75&brch=12&sim=88&cnt=1>
3. <https://www.youtube.com/watch?v=S1LDJUu4nko>
4. <http://physics.mq.edu.au/~jcresser/Phys301/Chapters/Chapter6.pdf>
5. https://homepage.univie.ac.at/reinhold.bertlmann/pdfs/T2_Skript_Ch_8.pdf

DEPARTMENT OF MATHEMATICS**Programme:** B.Sc. MATHEMATICS (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

PART – III : Ability Enhancement Course		SEMESTER - III
Course Title : MATHEMATICS – I		
Course Code: 05AE01	Hours per week: 6	Credits: 4
CIA: 25 Marks	ESE: 75 Marks	Total: 100 Marks

Preamble

To enable the students to acquire the basic knowledge in application of mathematics in differentiation and integration.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	understand the expression of trigonometric functions and its hyperbolic functions.	K ₁ , K ₂
CLO 2	acquire knowledge in solving problems in differential equations up to second order.	K ₂ , K ₃
CLO 3	acquire knowledge in solving problems in integral equations up to triple integral.	K ₂ , K ₃
CLO 4	understand the concepts involved in vector operators and its related problems.	K ₂
CLO 5	acquire knowledge in vector integration on basic theorems and its related problems.	K ₂ , K ₃

K1-Remembering**K2-Understanding****K3-Applying****Syllabus**

UNIT-I	Trigonometry Expression for $\sin n\theta$, $\cos n\theta$ & $\tan n\theta$ - Expression for $\sin^n \theta$ and $\cos^n \theta$ - Expansion of $\sin \theta$, $\cos \theta$ and $\tan \theta$ in powers of θ - Hyperbolic functions and inverse hyperbolic functions.	(18 Hrs)
UNIT-II	Differential Calculus Differentiation Methods - successive differentiation (up to second order derivative only, omit Leibnitz theorem)	(18 Hrs)
UNIT- III	Integral calculus Properties of definite integrals – Reduction formula for $\int \sin^n x dx$, $\int \cos^n x dx$ and $\int \sin^m x \cos^n x dx$ only - Double and triple integrals (simple problems).	(18 Hrs)
UNIT- IV	Vector Differentiation Differentiation of vectors - Gradient of a vector - Directional derivative and its maximum value – Divergence and curl of a vector – solenoidal and irrotational vectors (Simple problems only).	(18 Hrs)
UNIT- V	Vector Integration Line and Surface Integrals - Green's theorem, Stoke's theorem and Gauss Divergence theorem (Statements only - without proof) - Verifications (simple problems).	(18 Hrs)

Text Books

1. Ancillary Mathematics Paper- I (MKU 2006-2007) by Dr. S. Arumugam & Issac Publisher: New Gamma Publishing House, Palayamkottai edition 2007.
2. Ancillary Mathematics Paper- II (Revised) by Dr. S. Arumugam & Issac Publisher: New Gamma Publishing House, Palayamkottai edition 2004.

3. Calculus by Dr. S. Arumugam&Issac Publisher: New Gamma Publishing House, Palayamkottai edition 2011.

Unit	Text Books	Chapters
1	1	Chapter 4
2	3	Chapter 2 (2.3-2.11)
3	1	Chapter 3 (3.1-3.3, 3.5, 3.6)
4	2	Chapter 1
5	2	Chapter 2

Reference Book

Ancillary Mathematics by T.K ManikavasagamPillay& Others Viswanathan printers and publishers) Pvt. Ltd. Chennai.

Mapping of CLO with PLO

CLO – PLO Mapping for Course Code: 05AE01

05AE01	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	-	3	3	3	3	3
CLO2	9	-	3	3	3	3	3
CLO3	9	-	3	3	3	3	3
CLO4	9	-	3	3	3	3	3
CLO5	9	-	3	3	3	3	3
Weightage of the course	45	-	15	15	15	15	15
Weighted percentage of Course contribution to PLOs	3	0	2	2	2	4	1

Mapping of CLO with PSO

CLO – PSO Mapping for Course Code: 05AE01

05AE01	PSO1	PSO2	PSO3	PSO4	PSO5
CLO1	9	3	9	3	9
CLO2	9	3	9	3	9
CLO3	9	3	9	9	3
CLO4	9	9	3	9	3
CLO5	9	3	9	3	9
Weightage of the course	45	21	39	27	33
Weighted percentage of Course contribution to PSOs	6	2	4	5	4

Online Resources

Expansion of Trigonometry Ratio: <https://youtu.be/6Rw-GMEjQ8s><https://youtu.be/giAjpfwC2LE>

<https://youtu.be/2VMiwNcg0ek>

Inverse Trigonometry Ratio: <https://youtu.be/YXWKpgmLgHk>

<https://youtu.be/w9sjzaXEGVw>

<https://youtu.be/ADpxUQMCSng>

Hyperbolic function: <https://youtu.be/PtKQKc629v8>

Differential calculus: <https://youtu.be/A6Ad7VnSIZE>

<https://youtu.be/UwmWTxAXMk4> , <https://youtu.be/n2HDdExJWBU> , <https://youtu.be/om8OkTVrSbU>

Integral calculus: <https://youtu.be/iDSc2o-wE4I>

Vector Integration: <https://youtu.be/K37VbB5Ukxk>

Vector differentiation: <https://youtu.be/FfJtVvQtqTM>

Gauss divergence theorem: <https://youtu.be/kox4HHL43oM>

Stock's Theorem: <https://youtu.be/MZnymin9i3s>

Green's Theorem: <https://youtu.be/6fJE3vvjB8o>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part IV : SEC		Semester – III
Course Title : SOLAR ENERGY		
Course Code: 06SE31	Hours Per Week : 2	Credit: 2
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To gain more knowledge about Solar Energy in order to

- ❖ Familiarize the solar radiation and importance
- ❖ Understanding the effect of dust and shading
- ❖ Study the different solar collectors
- ❖ Learn about PV technology
- ❖ Know about solar furnace and solar cooker

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Know about the solar radiation and importance	K1, K2,K3
CLO 2	Learn the effect of dust and shading	K1, K2,K3
CLO 3	Study the different solar collectors	K1, K2,K3
CLO 4	Familiarize about PV technology	K1, K2,K3
CLO 5	Understanding the functions about solar furnace and solar cooker	K1, K2,K3

K1- Remembering
Applying

K2-Understanding

K3-

Syllabus

UNIT-I	Solar radiation analysis: The structure of the sun – The solar constant – Solar radiation outside the Earth's atmosphere - Solar energy measuring equipments – Pyranometers – Sunshine recorder	(6 Hrs)
UNIT-II	Solar Collectors: Liquid Flat Plate Collector General description of flat-plate collectors – Effect of dust and shading – Selection of materials for flat-plate collectors	(6 Hrs)
UNIT- III	Solar collectors: Focusing Focusing type – Introduction – solar concentrators and Receiver Geometries	(6 Hrs)
UNIT- IV	Solar Photo-Voltaic :Electric power generation Solar cell modules – Advantages and Disadvantages of Photovoltaic Solar energy conversion – Applications of Solar Photovoltaic system – PV Technology in India.	(6 Hrs)
UNIT- V	Some additional methods of solar energy utilization: Some additional methods of solar energy utilization – solar furnaces-solar cooking – application of solar energy in space	(6 Hrs)

Text Book

- Solar energy utilization, G.D.Rai, Khanna Publishers, Delhi,2006
Unit I: 3.1, 3.2, 3.4, 4.1, 4.3, 4.4
Unit II: 5.3, 5.11, 5.12
Unit III: 7.1, 7.3.
Unit IV: 15.6, 15.7, 15.10, 15.14
Unit V: 16.1, 16.5, 16.8

Reference Books

Non-Conventional Energy Sources, G.D.Rai, Khanna Publishers, Delhi, 2005

E-Resource

1. <http://www.authorstream.com/Presentation/SGPHY-4601263-solar-energy/>
2. <https://www.slideshare.net/vanitathakkar/solar-radiation-measurement-32602221>
3. <https://www.renewableenergyhub.co.uk/main/solar-thermal-information/the-different-types-of-solar-thermal-panel-collectors/>
4. <https://www.yourelectricalguide.com/2018/07/concentrating-solar-collector-types-power-plants-advantages-disadvantages.html>
5. <https://www.electrical4u.com/what-is-a-solar-pv-module/>
6. <https://www.slideshare.net/AkeemAzeez/solar-furnaces>
7. <https://www.slideshare.net/Magarampatel/solar-cooker-138633008>

PART – I TAMIL		SEMESTER : IV
Course Title : சங்க இலக்கியமும் நீதி இலக்கியமும்		
CourseCode : P1LT41	Hours per week : 6	Credits : 03
CIA : 25 Marks	ESE : 75 Marks	Total: 100 Marks

முன்னுரை

1. பண்டைத் தமிழர்களில் ஒரு சமூகம் சார்ந்த வாழ்க்கை முறையினை உணர்த்துதல்.
2. தனிமனித வாழ்க்கைகளின் வழி களவு- கற்பு ஒழுக்க நெறிமுறைகளை வெளிப்படுத்துதல்.
3. வாழ்வில் கடைபிடிக்க வேண்டிய நீதிநெறிகளைப் புகட்டுதல்.
4. அகம், புறம் சார்ந்த வாழ்க்கைக்கான இலக்கண வரம்புகளை தெளிவுபடுத்துதல்.
5. சங்கஇலக்கிய மற்றும் நீதிஇலக்கிய காலகட்டங்களின் வரலாற்றினை விவரித்தல்.

பாடத்திட்டத்தின் முடிவுகள்

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

NO.	ஊழரசளந டுநயசனெபெ முரவஉழஅந	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	பண்டைத் தமிழர்களில் ஒரு சமூகம் சார்ந்த ஒழுக்கங்கள் குறித்த நிலையினை வரையறை செய்தல்.	K1, K2
CLO 2	ஐந்திணை மக்களின் அகஒழுக்கங்கள் குறித்த செய்திகளை கலந்துரையாடுதல்.	K2, K3
CLO 3	சங்க இலக்கியம் மற்றும் நீதி இலக்கிய காலகட்டங்களில் வாழ்ந்த மக்கள் மற்றும் அவர்களின் வாழ்க்கையினை பதிவுசெய்த படைப்பாளர்கள் ஆகியோரின் வரலாற்றினை விவரித்தல்.	K2, K3
CLO 4	பழங்கால மக்களின் அகம், புறம் தொடர்பான வாழ்க்கை நிகழ்வுகளின் மரபுநிலைகள் குறித்த திறன்களை அறிவித்தல்.	K2
CLO 5	வாக்கியங்களைக் கண்டறிதல், சொற்களை ஒழுங்குபடுத்துதல், ஆங்கிலத்திற்கு நிகரான தமிழ்ச்சொற்களை கண்டறிதல், வழுவச்சொற்களை நீக்குதல் போன்ற ஒரு மொழியின் பயன்பாட்டுத் தன்மையை தெளிவுறுத்தல்.	K1, K2, K3

K₁-Remembering

K₂-Understanding

K₃-Applying

பாடத்திட்டம்

அலகு - 1	தமிழ்ச் சங்க இலக்கியம் (பத்துப்பாட்டு) 1. முல்லைப்பாட்டு	(18 மணிநேரம்)
அலகு - 2	தமிழ்ச் சங்க இலக்கியம் (எட்டுத்தொகை) 1.நற்றிணை - (3பாடல்கள்) 2.குறுந்தொகை - (5பாடல்கள்) 3.கலித்தொகை - (2பாடல்கள்) 4.அகநானூறு - (2பாடல்கள்) 5.புறநானூறு - (3பாடல்கள்)	(18 மணிநேரம்)
அலகு - 3	தமிழ் நீதி இலக்கியம் 1. திருக்குறள் (செய்நன்றி அறிதல், காலம் அறிதல், குறிப்பு அறிதல்) 2. பழமொழி நானூறு (கல்வி அதிகாரம்) 3. கொன்றை வேந்தன் (10 பாடல்கள்) 4. முதுரை (10 பாடல்கள்)	(18 மணிநேரம்)
அலகு - 4	தமிழ் இலக்கணம் - பொருள் 1. அகப்பொருள் (அகத்திணைகள் - முதல், கரு, உரிப்பொருள்) 2. புறப்பொருள் (புறத்திணைகள் - வெட்சி முதல் பெருந்திணை வரையுள்ள 12திணைகள்)	(18 மணிநேரம்)

	3. மரபியல் (பெயர் மரபுகள் - ஆண்பால்பெயர், பெண்பால்பெயர், இளமைப்பெயர்)	
அலகு - 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும் 1. சங்க இலக்கிய வரலாறு 2. நீதி இலக்கிய வரலாறு 3. புத்தக மதிப்புரை, தமிழ்த் திரைப்பட விமர்சனம், கவிதை படைத்தல்.	(18 மணிநேரம்)

பாட நூல்கள்

1.தமிழ் செய்யுட் தொகுப்பு (தமிழ்த்துறை வெளியீடு)

பார்வை நூல்கள்

1. தமிழ் இலக்கிய வரலாறு - சி.சேதுராமன்,பாவை பப்ளிகேஷன்ஸ்,16(142)ஜானிஜான்கான் சாலை,இராயப்பேட்டை, சென்னை - 600014.
2. தமிழ் இலக்கிய வரலாறு - முனைவர்பாக்யமேரி, நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட்,41-பி, சிட்கோ இண்டஸ்ட்ரியல் எஸ்டேட்,அம்பத்தூர், சென்னை- 600 098.

E-Resourse

1. <http://www.tamilvu.org/library/nationalized/pdf/17-kagovindan/mullaippattuoruvilakkam.pdf>
2. <https://www.keetru.com/index.php/2014-03-08-04-35-27/2014-03-08-12-18-14/2826-2010-01-29-08-13-35>
3. <https://www.youtube.com/watch?v=rDIzpWkbzn8>
4. https://www.youtube.com/watch?v=ZHNH_jlgznc
5. <https://www.youtube.com/watch?v=fOxJBfGOxgk>
6. <https://www.youtube.com/watch?v=fiK782BcyhY>

Mapping of CLO with PLO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	3	9	9	9	9	9
CLO2	9	9	9	9	9	3	9
CLO3	9	9	9	9	9	9	9
CLO4	9	3	3	9	9	9	9
CLO5	9	3	9	9	9	3	9
Weightage of the course	45	27	39	45	45	33	45
Weighted percentage of Course contribution to PLOs							

DEPARTMENT SANSKRIT

Programme: B.A./ B.Sc. (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

PART – I : Language		SEMESTER – IV
Course Title: DRAMA AND HISTORY OF SANSKRIT LITERATURE – IV		
Course Code: P1LS41	Hours per week: 6	Credits: 3
CIA Marks: 25 Marks	ESE Marks: 75 Marks	Total Marks: 100 Marks

Preamble:

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first four semesters the above column explains the scheme of the IV semester.

Course Outcomes (COs)

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

Number	Statement	Knowledge Level
CLO 1	To understand Sanskrit drama literature	K1, K2
CLO 2	Comparing drama with modern life	K2
CLO 3	Classify and discuss the importance of Sanskrit drama literature	K2
CLO 4	Describe and defend history of early Sanskrit literature	K2
CLO 5	Practice Creativity and Demonstrate different aspects of spoken sanskrit	K2, K3

K1-Knowledge

K2-Understand

K3-Apply

Syllabus

Unit 1: Introduction to Sanskrit drama literature, introduction and scope of spoken Sanskrit.

Unit 2: Characteristics features of Sanskrit dramas and Varieties of Sanskrit dramas, spoken Sanskrit for personal use.

Unit 3: Abhijnanasakuntalam Act –IV, up to arrival of sage Kanva to hermitage, Dramas of Bhāsa, spoken Sanskrit for Educational purpose

Unit 4: Abhijnanasakuntalam Act –IV, advice of sage Kanva to Sakuntala, Dramas of Kālidāsa, Moral and social aspects of dramas of Kālidāsa, spoken Sanskrit for commercial purpose.

Unit 5: Abhijnanasakuntalam Act –IV, up to the end of the play, Dramas of Bhavahūti, Moral and social aspects of dramas of Bhavahūti and other dramas,

Mapping of CO and PO

	PLO1	PLO 2	PLO3	PLO4	PLO5	PLO 6	PLO 7
CLO1	9	9	9	9	3	-	3
CLO2	9	9	3	9	3	3	3
CLO3	9	9	3	9	9	-	3
CLO4	3	9	9	9	9	-	3
CLO5	9	9	9	9	9	3	3
	39	45	33	45	33	6	15

Strong -9

Medium -3

Low -1

Text Book(s)

1. Kārṇabhāra of Bhāsa, pub. By R.S. Vadyar & sons, Palakkad, Kerala, 2004
2. A History of Sanskrit Literature, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai -625010. Year of publication 1996.

Reference Books

1. A Short History of Sanskrit Literature, by T.K. Ramachandra Aiyar, published by R.S. Vadyar & Sons, Kalpathi, Palakkad -678003.
2. A History of Sanskrit Literature, by A. Berriedale Keith, published by Mothilal Banarsidass Publishers Private Limited, Delhi, 2017.

DEPARTMENT OF ENGLISH**Programme:** B.A., & B.Sc., (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 onwards)

PART – II : English		SEMESTER – IV
Subject Title : ENGLISH FOR CAREER AND PROFESSIONAL DEVELOPMENTS		
Course Code: P2LE41/P2CE41	Hours per week: 6	Credit: 3
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble:

The students are expected to inculcate English language proficiency and its socio-linguistic competency.

Course Outcome (CO):

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO1	Examine authors' motivations on life-training through the prose discourses	K1, K2, K3
CLO2	Demonstrate the understanding of techniques of human communication studies from basic theories and process.	K1, K2, K3
CLO3	Weigh current global issues through creativity with prior knowledge of soft skills, and learned lessons	K1, K2, K3
CLO4	Take part and pass the English language proficiency examinations	K1, K2, K3
CLO5	Exercise LSRW skills	K1, K2, K3

K1-Remembering**K2 – Understanding****K3 –Applying****Mapping of CLO and PLO**

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	9	9	9	9	3	9
CLO2	9	9	9	3	9	-	9
CLO3	9	9	9	3	3	3	9
CLO4	9	9	3	-	-	-	9
CLO5	9	9	9	3	3	-	9
	45	45	39	18	24	06	45

Strong-9**Medium -3****Low -1****Syllabus****Unit-1****Prose**

1. The Teacher (Chapter-IV)
2. The Student (Chapter-V)
3. University Education on the Gurukula Pattern (Chapter-VI)
Swami Chidbhavananda – *The Indian National Education* (Text)

Unit-2 DramaWilliam Shakespeare-*The Tempest*

(for the three Continuous Internal Assessment [CIA] Tests)

Unit-3 Soft-Skills for Capacity Building

1. Interpersonal skills (Greetings and Leave-taking etc.)
2. Group Discussion for placement/career
3. Interview Skills for placement/career

Unit-4 English for Competitive Examinations

1. Spotting Errors (Articles & Tenses)
2. Analogy and One-Word Substitution
3. Synonyms and Antonyms

Unit-5 Oral & Written Communication

1. **Listening** – Comprehension practice from Prose, Drama etc /Online Voice Practice, observing/viewing E-content (with subtitles), Guest/Invited Lectures, Conference/Seminar Presentations & Tests, and DD National News Live, BBC, CNN, VOA etc
2. **Speaking** – In Group Discussion Forum, speak about Negotiation, Role-Play, Seminar Presentations on Classroom-Assignments, and Peer-Team-interactions/AIF in Classroom
3. **Reading** – Extensive Reading of Prose, (Film with subtitles), and Individual-Classroom-Assignments
4. **Writing** – Writing and editing Public Speech like Welcome Address/Vote of Thanks, Introducing a Speaker/Keynote Speech/Address, Master of Ceremony/Anchoring etc.*

Text Books

1. Swami Chidbhavananda. *The Indian National Education*. Tirupparaithurai: Sri Ramakrishna Tapovanam, 2017.
<http://www.rktapovanam.org/book_details.php?book_id=MjE=>
2. William Shakespeare. *The Tempest*. Ed. Morton Luce. London: Methuen & Co, 1919.
3. Cary J Green. *Leadership and Soft Skills for Students*. Indiana: Dog Ear Publishing. 2015. (or) Bruce Tulgan. *Bridging the Soft Skills Gap: How to Teach the Missing Basics to Today's Young Talent*: New Jersey: John Wiley & Sons Inc., 2015. (or) Owen Hargie, David Dickson, and Dennis Tourish. *Communication Skills for Effective Management*. New York: Palgrave Macmillan, 2004. (or) Dale Carnegie. *The Art of Public Speaking*. Massachusetts: Wyatt North Publishing, 2013.
4. Hari Mohan Prasad, and Uma Rani Sinha. *Objective English for Competitive Examinations*. New Delhi: McGrawHill Education, 2016. (or)
British Council | LearnEnglish <<https://learnenglish.britishcouncil.org/skills>>
5. BBC News <<https://www.bbc.com/news>> VOA Learning English
<<https://learningenglish.voanews.com/>>
University Grants Commission (UGC), New Delhi <<https://www.ugc.ac.in/subpage/EContent-URL.aspx>> British Council | LearnEnglish <<https://www.youtube.com/channel/UCOtnu-KKoAbN47luYMeDPOg>> Cambridge Assessment English
<<https://www.cambridgeenglish.org/test-your-english/>>
6. CLIL (Content & Language Integrated Learning) – Module by TANSCHÉ
NOTE: (Text: Prescribed chapters or pages will be given to the students by the department and the college)

Reference Books

1. Swami Chidbhavananda. *Vedanta Society*. <<https://sfvedanta.org/authors/swami-chidbhavananda/>>
2. Raman, Meenakshi and Sangeeta Sharma. *Technical Communication: Principles and Practice*. New Delhi, OUP, 2011.
3. Stephen E Lucal. *The Art of Public Speaking*. New York: McGraw-Hill Education, 2015.
4. Elaine Walker and Steve Elsworth. *Grammar Practice for Elementary Students*. Harlow (UK): Pearson, 2000.
5. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.
6. K.V. Joseph. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.
7. Edgar Thorpe, and Showick Thorpe. *Objective English for Competitive Examinations*. New Delhi: Pearson India Education, 2017.

E Resources and References

Unit-1 Prose

<https://www.slideshare.net/BharathiRaja6/the-teacher-taken-from-indian-national-education-by-srimath-swami-chidbhavananda>
<https://www.slideshare.net/BharathiRaja6/the-student-theory-on-students-role-in-gurukulam>
<https://www.slideshare.net/BharathiRaja6/part2-english-university-education-on-the-gurukula-pattern-taken-from-indian-national-education-by-srimath-swami-chidbhavananda-drsbharathiraja-assistant-professor-headic-department-of-english-vivekananda-college8870518474>

Unit-2 Drama

William Shakespeare-The Tempest

(for the three Continuous Internal Assessment [CIA] Tests)

Unit-3 Soft-Skills for Capacity Building

<http://ignou.ac.in/userfiles/Unit%201.pdf>

GREETINGS AND INTRODUCTION - IGNOU

<http://egyankosh.ac.in/bitstream/123456789/60752/1/Unit-1.pdf>

<http://bankatswamicollege.org/sites/default/files/upload/study%20material1.pdf>

<https://www.reed.co.uk/career-advice/group-interview-tips-dos-and-donts/>

<https://www.teachingenglish.org.uk/article/group-discussion-skills>

<https://www.interview-skills.co.uk/free-information/interview-guide/group-tasks-discussions>

<https://www.mheducation.co.in/placement-interviews-skills-for-success-9789351340140-india>

<https://www.prospects.ac.uk/careers-advice/interview-tips/how-to-prepare-for-an-interview>

Unit-4 English for Competitive Examinations

<https://www.tgct.gov.in/tgportal/staffcollege/DR%20ACTOs%2017.01.2020%20to%2018.02.2020/February%20-%202020%20%20PDF's/05.02.2020,%204.%20Smt.Suma%20Bindu%20Madam,%20Asst.Pr>

[ofessor%20and%20Trainer%20@CELT%20\(O.U\),%20SPOTTING%20ERRORS%202.pdf](ofessor%20and%20Trainer%20@CELT%20(O.U),%20SPOTTING%20ERRORS%202.pdf)

<http://www.grammarinenglish.com/spottingerrors/>

<https://www.jagranjosh.com/articles/important-one-word-substitution-questions-for-ssc-cgl-exam-1531479845-1>

<https://www.englishclub.com/vocabulary/synonyms-antonyms.htm>

Unit-5 Oral & Written Communication

<https://content.byui.edu/file/b8b83119-9acc-4a7b-bc84-efacf9043998/1/Writing-2-5-2.html>

<https://www.towson.edu/careercenter/students/careerskills/communication.html>

<https://www.slideshare.net/shahbaazahmed15/bc-communication>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – IV
Course Title : ANALOG ELECTRONICS		
Course Code: 06CT41	Hours Per Week : 4	Credit: 4
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To enable the students to

- ❖ Study the characteristics of diodes and their applications
- ❖ Familiarize bipolar and unipolar transistor and applications
- ❖ Adequate knowledge about different transistor amplifier circuits
- ❖ Study the different communication systems
- ❖ Analyses and applying AM in communication system

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Know the basic concepts of Junction diode and Zener diode	K1, K2,K3
CLO 2	Understanding the characteristics of BJT and JFET	K1, K2,K3
CLO 3	Analyse the Transistor circuits as amplifier	K1, K2,K3
CLO 4	Applying Transistor circuit as oscillators and Understanding the basics of op-amp	K1, K2,K3
CLO 5	Analyse and Applying AM in communication system	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I:	SEMICONDUCTOR DIODE: Crystal diode rectifiers – Half wave rectifier – Efficiency of Half wave rectifier – Full wave rectifier – Centre tap full wave rectifier – Full wave bridge rectifier – Efficiency of full wave rectifier – Nature of rectifier output – Ripple factor – Comparison of rectifiers – Filter circuits – Type of filter circuits – Voltage stabilization – Zener diode – Equivalent circuit of zener diode – Zener diode as voltage stabilizer – Solving zener diode circuits.	(10 Hrs)
UNIT-II:	TRANSISTOR AND FIELD EFFECT TRANSISTOR: Transistor as an amplifier in CE arrangement – Transistor load line analysis – Operating point – Practical way of drawn CE circuit – Output from transistor amplifier – Performances of transistor amplifier – Cut off and saturation points – Power rating of transistor – Semiconductor devices numbering system – Transistor lead identification – Transistor testing – Types of Field Effect Transistors – Junction Field Effect Transistor (JFET) – Working principle of JFET – Schematic symbol of JFET – Importance of JFET – Difference between JFET and Bipolar Transistor – JFET as an amplifier – Output characteristics of JFET – Importance terms – Expression for Drain current (I) – Advantages of JFET – Parameters of JFET – Relation among JFET parameters – JFET Biasing – JFET connections – Voltage gain of JFET amplifier – JFET applications..	(15 Hrs)

UNIT- III:	TRANSISTOR BIASING AND TRANSISTOR AMPLIFIERS: Transistor biasing – Stability factor – Methods of Transistor biasing – Base resistor method – Biasing with collector feedback resistor – Voltage divider bias method – Midpoint biasing – Silicon versus Germanium. Practical circuit of transistor amplifier – Phase reversal – DC and AC equivalent circuits – Load line analysis – Voltage gain – AC emitter resistance – Formula for AC emitter resistance – Voltage gain of CE amplifier-Input impedance of CE amplifier – Multistage Transistor Amplifier – Important terms – RC coupled transistor amplifier.	(15 Hrs)
UNIT- IV:	SINUSOIDAL OSCILLATORS AND OPERATIONAL AMPLIFIERS: Positive feedback amplifier – Oscillator – Essentials of transistor oscillator – Explanation of Barkhausen criterion – Colpitts oscillator – Hartley oscillator – Principle of Phase shift oscillators – Phase shift oscillator – Wien bridge oscillator – Limitations of LC and RC oscillators – Piezo electric crystals – Working of Quartz crystal – Equivalent circuit of crystal – Frequency response of crystal – Transistor crystal oscillator – Operational amplifiers – OP-AMP applications.	(10 Hrs)
UNIT- V:	MODULATION AND DEMODULATION: Radio Broad casting transmission and reception – Modulation – Types of modulation – Amplitude modulation – Modulation factor – Analysis of amplitude modulated wave – Side band frequencies in AM wave – Transistor AM modulator – Power in AM wave – Limitations of amplitude modulation – Frequency modulation – Demodulation – Essentials in demodulation – AM diode detector – AM radio receivers – Types of AM Radio receivers – Stages of super heterodyne – Radio receiver circuit.	(10 Hrs)

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	1	9	3	3	3	3
CLO 2	9	3	9	3	9	3	1
CLO 3	9	1	9	3	9	3	1
CLO 4	9	1	9	3	9	3	1
CLO 5	9	3	9	3	9	3	3
Weightage of the course	45	9	45	15	45	15	9
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	9	9	9
CLO 2	9	9	9	9	9
CLO 3	9	9	9	9	9
CLO 4	9	9	9	9	9
CLO 5	9	9	9	9	9
Weightage of the course	45	45	45	45	45
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Book

1) **Principles of Electronics**, V.K.Mehta & Rohit Mehta-S.Chand & Company Ltd, 2014

Chapters: UNIT 1: 6.7, 6.8, 6.10 to 6.13, 6.15, 6.17 to 6.21, 6.24 to 6.28

UNIT 2: 8.16 to 8.23, 8.25 to 8.27, 19.1 to 19.8, 19.10, 19.11 to 19.14, 19.16, 19.20, 19.24 and 19.26.

UNIT 3: 9.2, 9.6 to 9.8, 9.11, 9.12, 9.15, 9.18, 10.4, 10.5, 10.7 to 10.12, 10.15, 11.1, 11.3, 11.5

UNIT 4: 14.5 to 14.7, 14.10 to 14.20 and 25.1, 25.23, 25.24, 25.26 and 25.27

UNIT 5: 16.1 to 16.11, 16.14 to 16.19.

Reference Books

1. Electronic Principles – Albert Paul Malvino (Sixth Edition), Sixth Reprint 2013.

2. Electronic Devices and Circuits – Jacob Millman Christos C. Halkias, 1999

E-Resource

1. <http://www.authorstream.com/Presentation/NSLVC-4260428-analog-electronics-06ct41-ppt/>
2. <https://911electronic.com/semiconductor-diode/>
3. https://www.electronics-tutorials.ws/transistor/tran_5.html
4. <https://www.electronics-tutorials.ws/amplifier/transistor-biasing.html>
5. <https://www.electrical4u.com/hartley-oscillator/>
6. <https://www.electronics-tutorials.ws/oscillator/colpitts.html>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – IV
Course Title : NUMERICAL METHODS		
Course Code: 06CT42	Hours Per Week : 4	Credit: 4
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To enable the students

- ❖ Find the roots of transcendental equations by different methods
- ❖ Learn the solutions of linear algebraic equations
- ❖ Understanding the importance of interpolation in different fields
- ❖ Become familiar with the numerical differentiation and integration by various methods
- ❖ Find the solution of ordinary differential equations

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	To find the roots of transcendental equations by different methods	K ₁ ,K ₂ ,K ₃
CLO 2	Understanding the solutions of linear algebraic equations	K ₁ ,K ₂ ,K ₃
CLO 3	Analyse the importance of interpolation in different fields	K ₁ ,K ₂ ,K ₃
CLO 4	Applying familiar with the numerical differentiation and integration by various methods	K ₁ ,K ₂ ,K ₃
CLO 5	Analyse the solution of ordinary differential equations	K ₁ ,K ₂ ,K ₃

K₁- Remembering

K₂-Understanding

K₃-Applying

Syllabus

UNIT-I:	The solutions of Numerical Algebraic and Transcendental equations: The Bisection method – Iteration method (or Method of Successive Approximation) – Regula Falsi method – Newton Raphson method	(12 Hrs)
UNIT-II:	Solutions of Simultaneous Linear Algebraic Equations: Gauss elimination method – Gauss-Seidel method of iteration	(12 Hrs)
UNIT- III:	Interpolation, Central Difference Interpolation Formulae: Gregory-Newton forward interpolation formula – Gregory-Newton backward interpolation formula – Gauss's forward interpolation formula – Gauss's backward interpolation formula	(12 Hrs)
UNIT- IV:	Numerical Differentiation and Integration: Newton's forward difference formula to get the derivative – Newton's backward difference formula to compute the derivative – Trapezoidal rule – Simpson's one third rule- Simpson's one eight rule.	(12 Hrs)
UNIT- V:	Numerical solutions of ordinary differential equations: Power series approximations – Solution by Taylor series (Type 1) – Euler's method – Runge-kutta method	(12 Hrs)

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	3	1	1	1	1
CLO 2	9	3	3	1	1	1	1
CLO 3	9	3	3	1	1	1	1
CLO 4	9	3	3	1	1	1	1
CLO 5	9	3	9	1	1	1	1
Weightage of the course	45	15	21	5	5	5	5
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	3	3	1	3
CLO 2	3	3	1	1	3
CLO 3	3	3	3	3	3
CLO 4	9	3	1	1	3
CLO 5	3	9	3	3	3
Weightage of the course	27	21	11	9	15
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Books

1. Numerical Methods – P.Kandasamy, K.Thilagavathy & K.Gunavathi, (S.Chand & Company Ltd., New Delhi, 2014
Chapters: Unit 1: 3.1.1, 3.2 to 3.4
Unit 2: 4.2, 4.9
Unit 3: 6.2, 6.3, 7.3, 7.4
Unit 4: 9.2, 9.3, 9.9, 9.13
Unit 5: 11.3, 11.5, 11.9, 11.12, 11.13

Reference Books

1. Mathematical Physics – B.D. Gupta, Third Edition, Vikas Publishing House Pvt. Ltd., (Reprint 2007)
2. Mathematical Physics – P.K. Chattopadhyay, New Age International (P) Ltd., Publishers, New Delhi (Reprint 2004)
3. Computer Oriented Numerical Methods – V. Rajaraman, Prince Hall of India Publication, 2000
4. Introductory Methods of Numerical Analysis – S.S.Sastry, Prince Hall of India Publication, 2003

E-Resource

1. https://amsi.org.au/ESA_Senior_Years/SeniorTopic3/3j/3j_2content_2.html
2. <https://nptel.ac.in/content/storage2/courses/122104018/node18.html>
3. <https://nptel.ac.in/content/storage2/courses/122104018/node109.html>

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4. [https://math.libretexts.org/Courses/Mount_Royal_University/MATH_2200%3A_Calculus_for_Scientists_II/2%3A_Techniques_of_Integration/2.5%3A_Numerical_Integration - Midpoint%2C Trapezoid%2C Simpson's rule](https://math.libretexts.org/Courses/Mount_Royal_University/MATH_2200%3A_Calculus_for_Scientists_II/2%3A_Techniques_of_Integration/2.5%3A_Numerical_Integration_-_Midpoint%2C_Trapezoid%2C_Simpson's_rule)
 5. [https://math.libretexts.org/Bookshelves/Differential_Equations/Book%3A_Elementary_Differential Equations with Boundary Value Problems \(Trench\)/03%3A Numerical Methods/3.03%3A The Runge-Kutta Method](https://math.libretexts.org/Bookshelves/Differential_Equations/Book%3A_Elementary_Differential_Equations_with_Boundary_Value_Problems_(Trench)/03%3A_Numerical_Methods/3.03%3A_The_Runge-Kutta_Method)
 6. <https://www.intmath.com/differential-equations/11-eulers-method-des.php>

DEPARTMENT OF MATHEMATICS**Programme:** B.Sc. MATHEMATICS (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

PART – III : Ability Enhancement Course		SEMESTER - IV
Course Title : MATHEMATICS – II		
Course Code: 05AE02	Hours per week: 3	Credits: 3
CIA: 25 Marks	ESE: 75 Marks	Total: 100 Marks

Preamble

To enable the students to acquire the basic knowledge in solving differential equations and its applications.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	understand the formation of differential equations and its different forms.	K ₁ , K ₂
CLO 2	acquire knowledge in solving problems in differential equations of first order.	K ₂ , K ₃
CLO 3	acquire knowledge in solving problems in differential equations of higher order.	K ₂ , K ₃
CLO 4	understand the concepts involved in differential equations of homogeneous forms.	K ₂ , K ₃
CLO 5	acquire knowledge in solving problems in simultaneous differential equations and total differential equations.	K ₂ , K ₃

K1-Remebering**K₂-Understanding****K₃-Applying****Syllabus**

UNIT-I	Formation of differential equation – Differential equation of first order and first Degree – variables separable, Homogeneous equations - Nonhomogeneous equations of first degree.	(9 Hrs)
UNIT-II	Exact differential equations – Integrating Factors – Methods of finding Integrating Factors (Theorems without proof) - Linear equations – Bernoulli's equations.	(9 Hrs)
UNIT- III	Linear equations of higher order - Second order differential equation with constant coefficients – Methods of finding complementary function - Methods of finding particular integrals for the type e^{ax} , $\cos ax$, $\sin ax$, x^m , $e^{ax}V$.	(9 Hrs)
UNIT- IV	Homogenous linear equation with variable coefficients – Method of Solving a linear equation with variable coefficients by variation of parameters.	(9 Hrs)
UNIT- V	Simultaneous linear differential equations – Total differential equations.	(9Hrs)

Text Book

Differential equations and Applications by Dr.S. Arumugam&Issac. Publisher: New Gamma Publishing House, Palayamkottai – 2011 edition.

Unit	Chapters
1	Chapter 1 (1.1 – 1.2)
2	Chapter 1 (1.3 – 1.6)
3	Chapter 2 (2.1 – 2.3)
4	Chapter 2 (2.4 – 2.5)
5	Chapter 2 (2.6 – 2.7)

Reference Book

Ancillary Mathematics by T.K Manikavasagam Pillay & Others (Viswanathan printers and publishers) Pvt Ltd. Chennai.

Mapping of CLO with PLO

CLO – PLO Mapping for Course Code: 05AE02

05AE02	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	-	3	9	3	3	3
CLO2	9	-	3	9	3	3	3
CLO3	9	-	3	9	3	3	3
CLO4	9	-	3	9	3	3	3
CLO5	9	-	3	9	3	3	3
Weightage of the course	45	-	15	45	15	15	15
Weighted percentage of Course contribution to PLOs	3	0	2	5	2	4	1

Mapping of CLO with PSO

CLO – PSO Mapping for Course Code: 05AE02

05AE02	PSO1	PSO2	PSO3	PSO4	PSO5
CLO1	9	9	9	3	3
CLO2	3	3	3	3	3
CLO3	9	3	3	3	9
CLO4	9	3	3	3	3
CLO5	9	3	3	3	3
Weightage of the course	39	21	21	15	21
Weighted percentage of Course contribution to PSOs	5	2	2	3	2

Online Resources

1. <https://www.youtube.com/watch?v=BxUrBQm8IC0> – Introduction of first order linear differential equations
2. <https://www.youtube.com/watch?v=GSmCiYbX2xM> – Exact D.E
3. <https://www.youtube.com/watch?v=hNCE3AxbWj0> – Bernoulli's Equation
4. <https://www.youtube.com/watch?v=UFWAu8Ptth0> – Second order LDE
5. <https://www.youtube.com/watch?v=yTDx0Rzviak> – Second order LDE with variable coefficients

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DEPARTMENT OF MATHEMATICS**Programme:** B.Sc. MATHEMATICS (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

PART – III : Ability Enhancement Course		SEMESTER - IV
Course Title : MATHEMATICS – III		
Course Code: 05AE03	Hours per week: 3	Credits: 3
CIA: 25 Marks	ESE: 75 Marks	Total: 100 Marks

Preamble

To enable the students to acquire the basic knowledge in partial differentiation and its applications.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	understand the partial differential equations and solving its first order problems.	K ₁ , K ₂
CLO 2	acquire knowledge in solving problems in different types of partial differential equations.	K ₂ , K ₃
CLO 3	acquire knowledge in Laplace transforms and its applications.	K ₂ , K ₃
CLO 4	acquire knowledge in Inverse Laplace transforms and its applications.	K ₂ , K ₃
CLO 5	acquire knowledge in Fourier series, Odd and Even functions and its related problems.	K ₂ , K ₃

K1-Remebering**K2-Understanding****K3-Applying****Syllabus**

UNIT-I	Partial differential equations –formation– by elimination of arbitrary constants and arbitrary functions – first order partial differential equations – classification of integrals – solving first order p.d.e in Lagrange's form.	(9 Hrs)
UNIT-II	Solving p.d.e of some standard forms – Type I: $f(p, q) = 0$ – Type II: $z = px + qy + f(p, q)$ – Type III: $f(z, p, q) = 0$ – Type IV: $f_1(x, p) = f_2(y, q)$.	(9 Hrs)
UNIT- III	Laplace Transform: definition – Laplace transforms of $x^n, e^{ax}, \cos ax, \sin ax, \cosh ax, \sinh ax$ finding Laplace transforms of $f'(x), f(ax), xf(x)$ and $\frac{f(x)}{x}$	(9 Hrs)
UNIT- IV	Inverse Laplace Transforms – solution of differential equations using Laplace Transform- linear equations with constant coefficients and variable coefficients – simultaneous equations.	(9 Hrs)
UNIT- V	Fourier series – Fourier series for odd and even functions - half range Fourier cosine and sine series – Fourier series in a general interval.	(9 Hrs)

Text Books

1. Differential Equations and applications by Dr.S. Arumugam&Issac Publisher: New Gamma Publishing House, Palayamkottai (Reprint 2011).
2. Ancillary Mathematics (Paper III-MKU) by Dr.S. Arumugam&Issac. Publisher: New Gamma Publishing House, Palayamkottai (2004 Edition).

Unit	Text Books	Chapters
1	1	Chapter 4 (Section: 4.1-4.3)
2		Chapter 4 (Section: 4.4)
3		Chapter 3 (Section: 3.1)
4		Chapter 3 (Section: 3.2)
5	2	Chapter 9

Reference Book

Ancillary Mathematics by T.K Manikavasagam Pillay & Others (Viswanathan printers and publishers) Pvt. Ltd. Chennai.

Mapping of CLO with PLO

CLO – PLO Mapping for Course Code: 05AE03

05AE03	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	-	-	-	-	-	3
CLO2	9	-	-	-	-	-	3
CLO3	9	-	-	-	-	-	3
CLO4	9	-	-	-	-	-	3
CLO5	9	-	-	-	-	-	3
Weightage of the course	45	-	-	-	-	-	15
Weighted percentage of Course contribution to PLOs	3	0	0	0	0	0	1

Mapping of CLO with PSO

CLO – PSO Mapping for Course Code: 05AE03

05AE03	PSO1	PSO2	PSO3	PSO4	PSO5
CLO1	3	9	9	3	3
CLO2	3	9	9	3	3
CLO3	3	9	9	3	3
CLO4	3	9	9	3	3
CLO5	3	9	9	3	3
Weightage of the course	15	45	45	15	15
Weighted percentage of Course contribution to PSOs	2	4	4	3	2

Online Resources

PDE: <https://youtu.be/u4yBWpmB6z4> <https://youtu.be/OCLw11a0LTM>

Lagrange's form: <https://youtu.be/41U-i1Q7se0> <https://youtu.be/QLLOI382tZw>

Types of PDE: <https://youtu.be/ongICvz1BsQ> <https://youtu.be/vSdrKPNIIRE>

Laplace Transform: <https://youtu.be/luJMI37-nso> <https://youtu.be/EDVJotmT584>

Inverse Laplace transform: <https://youtu.be/P519nGupO8> <https://youtu.be/HuHgbEuUBSo>

Fourier Transform: https://youtu.be/-E_WkcdszKU <https://youtu.be/GtXmS5YH7XM>

<https://youtu.be/lkAvgVUvYvY>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : SEC		Semester – IV
Course Title : ASTROPHYSICS		
Course Code: 06SE41	Hours Per Week : 2	Credit: 2
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To gain more knowledge about Astrophysics in order to

- Know about the earth and the moon
- Study about sun and other stars
- Get knowledge about novae and supernovae
- Know basic ideas about galaxy and cosmology
- Familiar with Astronomical instruments

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Know about the earth and the moon	K1, K2,K3
CLO 2	Study about sun and other stars	K1, K2,K3
CLO 3	Cosmology get knowledge about novae and supernovae	K1, K2,K3
CLO 4	Ideas about galaxy and cosmology	K1, K2,K3
CLO 5	Familiar with Astronomical instruments	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	The Earth and the Moon : History of the earth-The atmosphere-The moon- Eclipses- Lunar eclipses and Solar Eclipses	(6 Hrs)
UNIT-II	The Sun: Introduction- ordinary gases- Physical properties-structure of the sun- sunspots-Sun Spot cycle- solar wind-solar flares	(6 Hrs)
UNIT- III	The Universe of stars: Birth of stars – chemical composition and the energy generation- luminosity of star – star models – supernova explosions	(6 Hrs)
UNIT- IV	Galaxy & Cosmology: Introduction – classification of galaxies – milky way galaxy-galactic clusters Cosmology –Big bang theory –Hubble's law	(6 Hrs)
UNIT- V	Astronomical Instruments: Introduction- elements of telescope-properties of the image - Kinds of optical telescope – refracting telescope – reflecting telescope- difference between reflecting telescope and refracting telescope- radio telescope	(6 Hrs)

Text Book

1. Concepts of Astrophysics – A.Mujiber Rahman, Scitech publications (India) Pvt. Ltd- Edition 2018.
Unit I : 4.1,4.3,4.7,4.10 to 4.12
Unit II : 2.1, 2.2, 2.6, 2.8,2.9, 2.11, 2.15
Unit III: 3.1, 3.2, 3.6, 3.7,3.9
Unit IV: 5.1 to 5.4, 6.3,6.5
Unit V : 7.1 to 7.6

Reference Books

1. An Introduction to Astrophysics – Baidyanath Basu, Tanuka Chattopadhyay, Sudhindra Nath Biswas PHI Learning Private Limited, New Delhi – Ninth Printing (Second Edition), 2012
2. Astrophysics of the Solar system – K.D. Abhyankar, Universities Press (India) Private Ltd., 1999
3. Astrophysics A Modern Perspective – K.S. Krishna Swamy, New Age International (P) Ltd., Publishers, New Delhi, Reprint 2003

E-Resource

1. <https://www.slideshare.net/GaneshanS4/milky-way-galaxy-232479336>
2. <https://www.slideshare.net/GaneshanS4/astrophysics-232479613>
3. <http://www.authorstream.com/Presentation/SGPHY-4599385-evolution-stars/>
4. <https://youtu.be/GnZ3dogED7w>
5. <https://youtu.be/j1Vs6dGGEvA>
6. <https://youtu.be/ZC2dfDS8g0Q>
7. <https://optcorp.com/blogs/astronomy/refractor-vs-reflector-telescopes>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Practical		Semester – IV
Course Title : MAJOR PRACTICAL – II		
Course Code: 06CP43	Hours Per Week : 2	Credit: 2
CIA Marks : 40	ESE Marks : 60	Total Marks : 100

Preamble

To enable the students

- To develop the practical skills by applying the laws and concepts in physics experiments

Syllabus

1	Potentiometer – Ammeter calibration
2	Potentiometer- Voltmeter calibration
3	Carey Foster Bridge- measurement of Low resistance
4	Self Inductance – by Anderson's bridge
5	Quantity sensitiveness of Ballistic Galvanometer
6	Internal resistance of a battery using B.G
7	M1/M2 deflection magnetometer – Tan A, Tan B
8	M & BH –Deflection Magnetometer
9	Field along the axis of circular coil – deflection methods
10	Grating – minimum deviation – dispersive power
11	Spectrometer- small angled prism
12	$i-i'$ curve –prism-spectrometer
13	Superposition theorem
14	Maximum power transfer theorem
15	LCR series resonance circuit
16	LCR parallel resonance circuit
17	Comparison of EMF's –Using spot deflection galvanometer
18	Comparison of Capacitances - Using spot deflection galvanometer
19	Solar cell characteristics
20	Fabry Perot Interferometer

Text Book

A Text book of Practical Physics – M.N. Srinivasan, S.Balasubramanian, R.Ranganathan, Sultan Chand & Sons, New Delhi, Reprint 2013

E-Resource

1. [https://www.brainkart.com/article/End-on-\(or\)-Tan-A-position--Deflection-magnetometer_3211/](https://www.brainkart.com/article/End-on-(or)-Tan-A-position--Deflection-magnetometer_3211/)
2. <https://www.selfstudys.com/uploads/pdf/ZfMw62uZaHEXUaurT1rp.pdf>
3. <https://youtu.be/CWWrpTkh5RA>
4. <https://youtu.be/AgoplKn11f4>
5. <https://youtu.be/pYIDJ3a8x6E>
6. <https://youtu.be/ewRYz9dgoaQ>
7. <https://youtu.be/WwexoU-gUoc>
8. <https://youtu.be/ua9Fb82C4f0>
9. <https://youtu.be/m9nGaCpndv0>
10. <https://youtu.be/S0GsrzjVkd4>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – V
Course Title : SOLID STATE PHYSICS		
Course Code: 06CT51	Hours Per Week : 6	Credit: 5
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

This course aims at study of crystal structures and determination of crystal structures, imperfections in crystals, dielectric, magnetic properties and super conductivity

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Understanding various crystal structures and familiarize with different X-ray diffraction methods	K1, K2,K3
CLO 2	Recognize different types of imperfections in crystals	K1, K2,K3
CLO 3	Understanding dielectric properties of materials	K1, K2,K3
CLO 4	Familiarize with different types of magnetic materials and their applications	K1, K2,K3
CLO 5	Understanding the basic concepts of superconductivity and its applications	K1, K2,K3

K1- Remembering**K2-Understanding****K3-Applying****Syllabus**

UNIT-I	Crystal Structure and X-ray Diffraction methods Introduction – Space lattice - Stacking sequences in metallic crystal structures - Directions in Crystals - Planes in crystals - Miller indices - Distances of separation between successive (hkl) planes- Diffraction of X-rays by crystal planes - X- Ray diffraction methods.	18 Hrs
UNIT-II	Imperfections in Crystals Imperfections in crystals - Energy of formation of vacancy - line imperfection - Edge dislocations - Screw dislocations - Surface imperfections - Stacking faults - Twin Boundary - Volume defects.	18 Hrs
UNIT- III	Dielectric Properties Introduction - Various polarization processes - Internal field –Classius –Mosotti Equation- Frequency dependence of dielectric constant - Dielectric breakdown - Ferro and Piezo electricity	18 Hrs
UNIT- IV	Magnetic Properties Introduction - Classification of magnetic materials - The quantum numbers - Origin of magnetic moment - classical theory of diamagnetism - Theory of paramagnetism - Ferro magnetism - Antiferro magnetic materials - Ferrimagnetic materials - Applications of different magnetic materials	18 Hrs
UNIT- V	Super Conductivity Introduction - Effect of magnetic field –Meissner effect- Effect of current - Type I and Type II - Super conductors - Thermal properties - Isotope effect - London equations - BCS theory - Flux quantization - Josephson Effect - Applications of super conductors - High Tc super conductivity - New developments.	18 Hrs

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	9	3	3	-	1	3
CLO 2	9	3	3	1	-	-	-
CLO 3	3	3	1	1	-	-	-
CLO 4	9	3	1	1	-	1	1
CLO 5	9	9	1	1	1	-	-
Weightage of the course	39	27	9	7	1	2	4
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	3	3
CLO 2	9	9	3	-	3
CLO 3	9	3	1	-	3
CLO 4	9	3	1	1	4
CLO 5	9	9	3	3	3
Weightage of the course	45	33	11	7	13
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Book

Solid State Physics, P.K. Palanisamy, 2004, Scitech Publications (India) Pvt. Ltd., Chennai

Unit I: 2.1 - 2.3, 3.1 - 3.6

Unit II: 4.1- 4.8

Unit III: 7.1 - 7.6

Unit IV: 8.1 - 8.10

Unit V: 10.1 - 10.12

Reference Books

1. Solid State Physics, S.O. Pillai, Revised Sixth Edition 2005, New Age International (P) Ltd. New Delhi
2. Solid State Physics, M.A. Wahab, Second Edition 2005, Structure and Properties of Material, Narosa Publishing House Pvt. Ltd., Delhi.
3. Solid State Physics, S.T. Gupta and V. Kumar, Eighth Edition 2003, K. Nath & Co Publishers, Meerut.

E-Resource

1. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Book%3A_Physical_Methods_in_Chemistry_and_Nano_Science_\(Barron\)/07%3A_Molecular_and_Solid_State_Structure/7.01%3A_Crystal_Structure](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Book%3A_Physical_Methods_in_Chemistry_and_Nano_Science_(Barron)/07%3A_Molecular_and_Solid_State_Structure/7.01%3A_Crystal_Structure)
2. <https://www.slideshare.net/bharathpharmacist/81347482-xraydiffractiontechnique-39635806>
3. <https://www.slideshare.net/SuhasiniKulkarni4/crystal-imperfections-67759090>
4. https://hmmcollege.ac.in/uploads/Clausius_Mossotti_Debye_Equation.pdf
5. <https://www.vedantu.com/physics/diamagnetism-ferromagnetism-and-paramagnetism>
6. <http://hyperphysics.phy-astr.gsu.edu/hbase/Solids/scond.html>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – V
Course Title : DIGITAL ELECTRONICS		
Course Code: 06CT52	Hours Per Week : 6	Credit: 5
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

This course aims at study of fundamental electronics, data processing circuits, flips flops, register and counters, communication system and microprocessor.

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Learn the Digital Electronic fundamentals and circuits such as Number system and Codes, Combinational circuits and Data Processing circuits	K1, K2,K3
CLO 2	Know more about Arithmetic circuits, Clocks and Timing circuits	K1, K2,K3
CLO 3	Gain in-depth knowledge about Flip-flops, Registers and Counters, A/D and D/A convertors	K1, K2,K3
CLO 4	Gain knowledge about Communication systems and Types of Modulation	K1, K2,K3
CLO 5	Learn about Microprocessor, Arithmetic operators like Addition and Subtraction	K1, K2,K3

K1- Remembering**K2-Understanding****K3-Applying****Syllabus**

UNIT-I	Digital Logic, Combinational Logic Circuits , Data processing circuits and Number Systems and Codes Basic gates – Universal logic gates- (NOR, NAND) – AND, OR and INVERT gates - Boolean Laws and Theorems - Multiplexers - Demultiplexers - 1 of 16 decoder - BCD to Decimal decoders - Seven segment Decoders - Encoders - Exclusive OR gates - Binary to Decimal conversion - Decimal to Binary conversion - Octal numbers - Hexadecimal numbers - The ASCII code - The excess 3 code - The gray code.	18 Hrs
UNIT-II	Arithmetic circuits and Clocks and Timing Circuits Binary addition - Binary subtraction - Unsigned binary numbers - Sign-magnitude numbers - 2's complement representation - 2's complement arithmetic - Arithmetic building blocks - The adder subtracter.-Clock waveforms - TTL clock - Schmitt trigger - 555 Timer - Astable - 555 Timer - Monostable.	18 Hrs
UNIT- III	Flip – Flops RS Flip- Flops - Gated Flip- Flops - Edge triggered RS Flip Flops - Edge triggered JK flip flops - Flip Flop timing - JK Master slave flip-flops. Registers and Counters: Types of Registers – Serial In-Serial Out – Serial In-Parallel Out – Asynchronous counters - Synchronous counters	18 Hrs
UNIT- IV	Communication systems Amplitude Modulation Theory – Frequency spectrum of the AM wave-Representation of AM wave-Theory of Frequency and Phase Modulation – Generation of Frequency Modulation – Pulse Modulation	18 Hrs
UNIT- V	Microprocessor Microprocessor - Initiated operations and 8085 Bus Organization - Internal Data operations and the 8085 Registers - The 8085 microprocessor (Pinout and signals diagram only) - The 8085 A microprocessor functional block diagram - The	18 Hrs

	8085 instruction set - Review of the 8085 operations - Instruction word size - Overview of the 8085 instruction set. Addition of two 8-bit numbers; Sum 8 bits – 8 bit subtraction – Find One's Complement of an 8 bit number – Find Two's Complement of an 8 bit number	
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Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	3	3	3	1	1
CLO 2	9	3	3	9	3	1	1
CLO 3	9	3	3	9	3	1	1
CLO 4	9	3	3	9	3	1	1
CLO 5	9	3	3	9	3	1	1
Weightage of the course	45	15	15	45	15	5	5
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	3	3	1	3	3
CLO 2	3	1	1	3	3
CLO 3	3	3	3	3	9
CLO 4	3	1	1	3	9
CLO 5	9	3	3	3	9
Weightage of the course	21	11	9	15	33
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Book

- Digital Principles and Applications - D.P.Leach and A.P. Malvino. 7th Edition. Tata McGraw Hill Publishing Company Pvt. Ltd., New Delhi Sixth Reprint 2013.
UNIT I: 2.1 - 2.3, 3.1,4.1 – 4.7, 5.2 -5.8
UNIT II: 6.1 – 6.8, 7.1 – 7.5
UNIT III: 8.1 - 8.3, 8.5 – 8.7, 9.1 – 9.3, 10.1,10.3.
- Electronic Communication Systems – George Kennedy & Bernard Davis 4th Edition, Tata McGraw Hill Publishing Company Pvt. Ltd., New Delhi 8th Reprint 2001
UNIT IV: 3.1, 3.1.1,3.1.2, 5.1, 5.2.1, 5.2.2, 5.2.3, 5.3, 13.2
- Microprocessor Architecture, programming and applications with the 8085 Ramesh S. Gaonkar (Fourth Edition), 2006
UNIT V: 2.11, 2.12, Figure 3.1, Figure 3.7,
- Fundamentals of Microprocessor and Microcomputers – B. Ram (6th Revised and Enlarged Edition) Dhanpat Rai Publications Pvt. Ltd, New Delhi
Unit V: 5.21, 5.22, 5.31, 5.5 6.3, 6.4, 6.9, 6.11

Reference Books

1. Fundamentals of Digital Circuits - A. Anand Kumar ,Prentice Hall of India Pvt. Ltd., New Delhi (2001).
2. Digital Electronics- Circuits and Systems - V.K. Puri, Seventh Reprint 2002, Tata McGraw Hill Publishing Company. New Delhi.

E-Rsource

1. <https://www.youtube.com/watch?v=LrvtZ9kaYFg>
2. <https://nptel.ac.in/courses/117/106/117106086/>
3. https://www.youtube.com/watch?v=2ecMG_OciLo
4. <https://www.youtube.com/watch?v=8JMfp-y335s>
5. <https://nptel.ac.in/courses/108/102/108102120/>
6. https://www.youtube.com/watch?v=fS7FFOaC_iQ

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Practical		Semester – V
Course Title : MAJOR PRACTICAL - III		
Course Code: 06CP53	Hours Per Week : 9	Credit: 5
CIA Marks : 40	ESE Marks : 60	Total Marks : 100

Preamble

To enable students to

- Develop the practical skills by applying the laws and concepts of physics and electronics experiments.

Syllabus

(Any fourteen experiments)

- 1) Semiconductor Diode Characteristics
- 2) Characteristics of Zener Diode
- 3) Characteristics of Bipolar Transistors
- 4) JFET Characteristics
- 5) Characteristics of Photo diode and Photo Transistor
- 6) Clipping and Clamping circuits
- 7) Integrator, Differentiator using discrete components
- 8) h – Parameters of Transistors
- 9) Split Power supply
- 10) Measurement of Op-Amp parameters
- 11) Calculation of RMS value of Sine and Triangular wave form
- 12) Study of Logic gates – Using discrete components
- 13) Viscometer – Searle's Pattern
- 14) Lummer – Brodhum Photometer
- 15) Determination of Hysteresis Loss of a transformer by CRO
- 16) Surface tension – Jaeger's apparatus
- 17) Michelson Interferometer
- 18) Constant Deviation Spectrograph

Text Book

Practical Physics and electronics – C.C.Ouseph, U.J.Rao and V.Vijayendran Viswanathan Pvt.Ltd 2007

E-Resource

1. https://www.youtube.com/watch?v=F2m_VZJM0Zc
2. <http://vlabs.iitkgp.ernet.in/be/exp10/index.html#>
3. <https://www.cmi.ac.in/~debangshu/lab1/zener.pdf>
4. <http://vlabs.iitkgp.ernet.in/be/exp11/index.html#:~:text=of%20a%20BJT-.Structure%20of%20Bipolar%20Junction%20Transistor,as%20PNP%20or%20as%20NP.N.&text=They%20have%20three%20regions%20and,%2C%20B%2C%20and%20C%20respectively.>
5. <http://vlabs.iitkgp.ac.in/mvlsi/exp3/index.html#>
6. <http://vlabs.iitb.ac.in/rec-bootathon/innovationgeeks-clipper-clamper-skit/theory.html>
7. http://web.sonoma.edu/users/m/marivani/es231/units/experiment_06_clamping2.pdf
8. <https://vlab.amrita.edu/?sub=1&brch=282&sim=1507&cnt=1>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : DSE		Semester – V
Course Title : OBJECT ORIENTED PROGRAMMING WITH C++		
Course Code: 06DS5A	Hours Per Week : 5	Credit: 5
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To gain more knowledge about Object Oriented Programming in order to

- Learn the object oriented programming language
- Know about the basic concepts of control structures and functions
- Familiarize classes and objects
- Know about constructors, destructors and operators overloading.

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Learn the most widely used OOP language, the need, principles and applications of OOP.	K1, K2,K3
CLO 2	Know about the basic concepts like Tokens, Expressions, Control structures and Functions in C++.	K1, K2,K3
CLO 3	Familiarize the concepts such as Classes and Objects	K1, K2,K3
CLO 4	Understanding about Constructors, their types, Destructors, Operator overloading and Type conversions	K1, K2,K3
CLO 5	Learn salient features as Inheritance, its types and Virtual Base Class.	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I:	Principles of Object-Oriented Programming: Software crisis - Software evolution - A look at procedure - oriented programming - object oriented programming paradigm - Basic concepts of object oriented programming - Benefits of OOP - Object oriented languages - Applications of OOP. Beginning with C++: What is C++? - Applications of C++ - A simple C++ program - More C++ statements - An example with class - structure of C++ program - More C++ statements - An example with class - Structure of C++ program - Creating the source file - compiling and linking	(15 Hrs)
UNIT-II:	Token, Expressions and Control Structures: Introduction - Tokens - Keywords - Identifiers and constants - Basic Data types - User Defined Data Types - Derived Data Types - Symbolic constants - Type compatibility - Declaration of variables - Dynamic initialization of variables - Reference variables - operators in C++ - Scope resolution operator - member Dereferencing operators - Memory management operators - Manipulators - type cast operator - Expressions and their types - Special assignment expressions - Implicit conversions - Operator overloading - Operator precedence - control structures. Functions in C++: Introduction - The main function - function prototyping - call by	(15Hrs)

	reference - return by reference - Inline functions - Default arguments - const arguments - Function overloading - Friend and Virtual functions - Math Library functions.	
UNIT- III:	Classes and Objects: Introduction - C structures revisited - specifying a class - Defining member functions - A C++ program with class - Making an outside function inline - Nesting of member functions - private member functions - Arrays within a class - memory allocation for objects - Static Data members - Static member functions - Arrays of objects - Objects as function arguments - Friendly functions.	(15 Hrs)
UNIT- IV:	Constructors and Destructors: Introduction - Constructors - Parameterised constructors - Multiple constructors in a class - constructors with default arguments - Dynamic initialization of objects - copy constructor - dynamic constructors - destructors. Operator Overloading and Type conversions: Introduction - Defining operator overloading - Overloading unary operators - Overloading Binary operators - Overloading Binary operators using friends - Rules for overloading operators - Type conversions.	(15 Hrs)
UNIT- V:	Inheritance : Extending classes: Introduction - Defining Derived classes - Single Inheritance - Making a private member inheritable - Multi level inheritance - Multiple inheritance - Hierarchical inheritance - Hybrid inheritance - Virtual Base Classes - Abstract classes.	(15 Hrs)

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	9	1	3	1	1
CLO 2	9	3	9	1	3	1	1
CLO 3	9	3	3	1	1	1	1
CLO 4	9	1	3	1	1	1	1
CLO 5	9	1	3	1	1	1	1
Weightage of the course	45	11	27	5	9	5	5
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	3	9
CLO 2	9	9	3	3	9
CLO 3	9	9	3	3	3
CLO 4	9	3	1	1	3
CLO 5	9	3	1	1	3
Weightage of the course	45	27	11	11	27
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Books

1. Object Oriented Programming with C++ - E. Balagurusamy, (6th Edition)
2013, Tata McGraw Hill Publishing Company Pvt. Ltd., New Delhi

Chapters: Unit I: 1.1 - 1.8, 2.1 - 2.8 Unit II: 3.1 - 3.25, 4.1 - 4.12
Unit III: 5.1 - 5.15 Unit IV: 6.1 - 6.8, 6.11, 7.1 - 7.5, 7.8, 7.9.
Unit V: 8.1 - 8.10

Reference Books

1. Programming with C++ - John R. Hubbard Schaum's outline series, McGraw Hill (1996)
2. Object oriented programming in Turbo C++ - Robert Lafore Galgotia publications Pvt. Ltd., New Delhi (1999)

E-Resource

1. <https://www.youtube.com/watch?v=l0qvxPPISuY>
2. <https://www.youtube.com/watch?v=7BVt6OGfVfQ>
3. <https://www.youtube.com/watch?v=5Y74odV3IAI>
4. https://www.youtube.com/watch?v=_cbfR690u74
5. https://www.youtube.com/watch?v=mgU_ZAX7Gbs
6. <https://www.youtube.com/watch?v=nmq3PkD1gEU>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : DSE		Semester – V
Course Title : PROGRAMMING WITH C		
Course Code: 06DS5B	Hours Per Week : 5	Credit: 5
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To gain more knowledge about the basic of programming with C

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Learn the most widely used C programming language	K1, K2,K3
CLO 2	Know about Basic Operators	K1, K2,K3
CLO 3	Familiarize the if statements and looping	K1, K2,K3
CLO 4	Understanding about One dimensional, Two dimensional and Multidimensional arrays	K1, K2,K3
CLO 5	Know about basic concepts of pointers	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I:	OVER VIEW OF C, CONSTANTS, VARIABLES AND DATA TYPES Over view of C: Importance of C – Basic structure of C programs – Programming style – Executing a C program. Constants, Variables and Data Types: Introduction – Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Data Types – Declaration of Variables – Declaration of Storage Class – Assigning Values to Variables – Defining Symbolic Constants – Declaring a Variable as Constant – Declaring a Variable as Volatile.	(15 Hrs)
UNIT-II:	OPERATORS AND EXPRESSIONS Introduction – Arithmetic Operators – Relational Operators – Logical Operators – Assignment Operators – Increment and Decrement Operators – Conditional Operator – Bitwise Operators – Special Operators – Arithmetic Expressions – Evaluations of Expressions – Precedence of Arithmetic Operators – Type Conversions in Expressions – Operator Precedence and Associativity – Mathematical Functions.	(15Hrs)
UNIT- III:	DECISION MAKING AND BRANCHING, DECISION MAKING AND LOOPING Decision Making and Branching: Introduction – Decision Making with if Statement – Simple if Statement – The if...else Statement – Nesting of if...else Statement – The Else if Ladder – The Switch Statement – The ? : Operator – Goto Statement. Decision Making and Looping: Introduction – The While Statement – The do Statement – The for Statement – Jumps in Loops.	(15 Hrs)
UNIT- IV:	ARRAYS, USER-DEFINED FUNCTIONS Arrays: Introduction – One-dimensional Arrays – Declaration of One-dimensional Arrays – Initialization of One-dimensional Arrays –	(15 Hrs)

	Two-dimensional Arrays – Initializing Two-dimensional Arrays – Multi-dimensional Arrays. User-defined Functions: Introduction – Need for User-defined Functions – A Multi-function Program – Elements of User-defined Functions – Definition of Functions – Return Values and their Types – Function Calls – Function Declaration – Category of Functions – No Arguments and No Return Values – Arguments but No Return Values – Arguments with Return Values – No Arguments but Returns a Value – Recursion.	
UNIT- V:	STRUCTURES AND UNIONS, POINTERS Structures and Unions: Introduction – Defining a Structure – Declaring Structure Variables – Accessing Structure Members – Structure Initialization – Arrays of Structures – Arrays within Structures – Structures within Structures - Unions. Pointers: Introduction – Understanding Pointers – Accessing the Address of a Variable – Declaring Pointer Variables – Initialization of Pointer Variables – Accessing a Variable through the Pointer – Chain of Pointers – Pointer Expressions.	(15 Hrs)

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	9	1	3	1	1
CLO 2	9	3	9	1	3	1	1
CLO 3	9	3	9	1	1	1	1
CLO 4	9	3	9	1	1	1	1
CLO 5	9	3	3	1	1	1	1
Weightage of the course	45	15	30	5	9	5	5
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	3	9
CLO 2	9	9	3	3	9
CLO 3	9	9	3	3	3
CLO 4	9	3	1	1	3
CLO 5	9	3	1	1	3
Weightage of the course	45	27	11	11	27
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Books

1. Programming in ANSI C, E. Balagurusamy , Tata Mc Graw Hill publishing Company Pvt. Ltd., New Delhi

Chapters: Unit I: 1.2, 1.8 to 1.10, 2.1 to 2.13 Unit II: 3.1 to 3.16

Unit III: 5.1 to 5.9, 6.1 to 6.5

Unit IV: 7.1 to 7.7, 9.1 to 9.13, 9.16

Unit V: 11.1 to 11.8

Reference Books

-
1. ProgrammingwithC (Schaum's Outlines Series) by Byron Gottfried
 2. Let Us C by Yashavant Kanetkar

E-Resource

1. <https://www.guru99.com/c-programming-language.html>
2. <https://www.youtube.com/watch?v=si-KFFOW2gw>
3. <https://www.youtube.com/watch?v=AWliApDc61w>
4. <https://www.w3schools.in/c-tutorial/intro/>
5. <http://www1.cs.columbia.edu/~naliniv/teaching/3101/types.pdf>
6. <http://www.vpscience.org/materials/C%20lang%20Unit%203.pdf>
7. <https://www.programiz.com/c-programming/c-arrays>
8. <https://www.programiz.com/c-programming/c-user-defined-functions>
9. <https://www.guru99.com/difference-structure-union-c.html>
10. <https://www.programiz.com/c-programming/c-pointers>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Skill Based Theory		Semester – V
Course Title : FIBRE OPTIC COMMUNICATION		
Course Code: 06SB51	Hours Per Week : 2	Credit: 2
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To gain more knowledge about fibre optics fundamentals, fabrication process and types of lasers.

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Provide a good foundation in fibre optics	K1, K2,K3
CLO 2	Gain knowledge about different fibre optic fabrication process.	K1, K2,K3
CLO 3	Learn the basic principles, theory and concepts of fibre optics.	K1, K2,K3
CLO 4	Understanding the concept of DHLED & different LED structures,	K1, K2,K3
CLO 5	Gain knowledge about digital and analog laser transmitter.	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	Refractive index and velocity of light Propagation of light in different media –Propagation of light waves in an optical fibre-Basic structure of an optical fibre and propagation of light wave through it – acceptance cone and numerical aperture	(6 Hrs)
UNIT-II	Classification of Optical fibre: Fibre classification – Stepped index fibre – stepped index multimode fibre – graded index multimode fibre – plastic fiber	(6 Hrs)
UNIT- III	Fibre Fabrication Classification of fibre fabrication-external chemical vapour deposition – axial vapour deposition-internal chemical vapour deposition- multi element glasses- phasil system.	(6 Hrs)
UNIT- IV	LED & Semiconductor Laser Basic theory of double hetero junction LED (DHLED) - Different LED structures- basic principles of laser action s-p n junction photodiode – p-i-n photodiode – p-i-n-avalanche diode – phototransistors.	(6 Hrs)
UNIT- V	Optical Fibre communication Transmitter for Fibre optic communication – digital laser transmitter- analog laser transmitter – Fibre optic receiver- Important applications of integrated optic fibre technology.	(6 Hrs)

Text Book

1. Optical fibres and fibre optic communication – Subir Kumar sarkar – S.Chand & Company Ltd., New Delhi, Revised Edition 2010.

Unit I: 2.1 to 2.5

Unit II: 3.1 to 3.3, 3.5, 3.6

Unit III: 4.1 to 4.6

Unit IV: 9.2(a), 9.3, 10.6 to 10.9

Unit V: 15.2,15.7,15.8,15.12,18.2

Reference Books

1. Fibre- optic communication system, Govind P.Agarwal, A.John Wiley & Sons Edition 2002
2. Optical Communication essentials, Gerd Keiser, n Tata Mc Graw Hill Publishing Pvt. Ltd. New Delhi, 2008.

E-Resource

1. <https://www.tutorialspoint.com/Transmission-of-Light-Through-Fiber#:~:text=In%20fiber%20optic%20communication%2C%20signals,refraction%20and%20total%20internal%20reflection.>
2. <https://gradeup.co/light-propagation-in-optical-fibers-i-619bf204-b9f6-11e5-a2ac-8359df70799f>
3. http://www.brunel.ac.uk/~eestprh/EE5514/lesson1_new.pdf
4. <https://community.fs.com/blog/step-index-multimode-fiber-vs-graded-index-multimode-fiber.html>
5. [https://www.slideshare.net/ARNABGHOSH126/fabrication-of-fibers#:~:text=TYPES%20OF%20FIBER%20FABRICATION%20%E2%80%A2,PCDV\)%20%E2%80%A2%20General%20Fiber%20Fabrication.](https://www.slideshare.net/ARNABGHOSH126/fabrication-of-fibers#:~:text=TYPES%20OF%20FIBER%20FABRICATION%20%E2%80%A2,PCDV)%20%E2%80%A2%20General%20Fiber%20Fabrication.)
6. <https://www.electrical4u.com/p-i-n-photodiode-avalanche-photo-diode/>
7. <https://www.electronics-notes.com/articles/connectivity/fibre-optics/optical-transmitter.php>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Theory		Semester – VI
Course Title : NUCLEAR PHYSICS		
Course Code: 06CT61	Hours Per Week : 4	Credit: 4
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

This course aims at study of classification of nuclei, general properties, nuclear forces and various models, discovery of radioactivity, artificial transmutation, nuclear fission and fusion, particles, antiparticles and dark matter.

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Understanding nucleus, its structure, detectors of nuclear radiation and particle accelerators	K1, K2,K3
CLO 2	Expose of radioactivity, range and its measurements	K1, K2,K3
CLO 3	Expand knowledge about artificial transmutation of elements and Classification of neutron	K1, K2,K3
CLO 4	Study more about nuclear fission and fusion and nuclear reactors	K1, K2,K3
CLO 5	Understanding about the Elementary particles	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I:	Introduction to the Nucleus: Classification of nuclei – General properties of nucleus – Binding energy – Nuclear stability – Theories of nuclear composition – Nuclear forces – Meson theory of nuclear forces – The Liquid drop model – The Shell model – Ionization chamber – Proportional counter – Geiger-Muller counter – The Wilson cloud chamber – The Cyclotron – The Synchrocyclotron – The Betatron	12 Hrs
UNIT-II:	Radioactivity: Discovery of Radioactivity – Natural Radioactivity – Alpha, Beta and Gamma rays – Properties of Alpha, Beta and Gamma rays – Determination of charge of Alpha particles – Velocity of Alpha particles – Range of Alpha particles – Experimental measurement of Alpha particle - Alpha particle spectra – Beta rays spectra – Magnetic spectrograph – Origin of the line and continuous spectrum – The neutrino theory of Beta decay – Determination of the wavelength of Gamma rays – Origin of Gamma rays – Law of Radioactive Disintegration – The mean life – Measurement of decay constant – Units of Radioactivity	12 Hrs
UNIT- III:	Artificial transmutation of elements: The discovery of artificial transmutation – Bohr's theory of nuclear disintegration – Threshold energy of endoergic reaction – Preparation of Radioelements – Applications of Radioisotope – The discovery of Neutron – Basic properties of neutron – Classification of neutron – Neutron sources – Neutron deduction	12 Hrs

UNIT- IV:	Nuclear fission, fusion and nuclear reactors: Nuclear fission – Energy released in fission – Chain reaction – Atom bomb – Nuclear reactors – Nuclear fusion – Pressurized water reactor – Boiling water reactor – Fast Breeder reactor	12 Hrs
UNIT- V:	Elementary particles and the Universe: Introduction – Particles and Antiparticles – Antimatter – The fundamental interaction – The Quark model - The Big Bang theory – Thermal history of Universe – Hubble's law – The future of the Universe	12 Hrs

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	9	3	1	3	1	1
CLO 2	9	3	3	1	3	1	1
CLO 3	3	3	1	1	1	1	1
CLO 4	9	3	1	1	1	1	1
CLO 5	9	9	1	1	1	1	1
Weightage of the course	39	27	9	5	9	5	5
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	3	3	1	3	3
CLO 2	3	1	1	3	3
CLO 3	3	3	3	3	9
CLO 4	3	1	1	3	9
CLO 5	9	3	3	3	9
Weightage of the course	21	11	9	15	33
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Books

Modern Physics - R. Murugesan and Kiruthiga Sivaprasath, 17th Revised Edition 2014, S. Chand & Company Ltd., New Delhi

Chapters

Unit I:	27.2 – 27.11, 29.3, 29.5, 29.6, 29.7, 30.4, 30.5, 30.6
Unit II:	31.1 – 31.6, 31.8- 31.11, 31.13, 31.19-31.22, 31.24, 31.25, 31.30 – 31.33
Unit III:	34.1, 34.2, 34.6, 34.10 – 31.16
Unit IV:	35.2 – 35.7, 36.1 – 36.3
Unit V:	38.1 – 38.4, 38.7, 37.12 – 37.14

Reference Books

1. Nuclear Physics – D.C. Tayal – Himalaya Publishing House, Bombay.
2. Concepts of Modern Physics – Arthur Beiser, Shobhit Mahajan, S.Rai Choudhury sixth Edition, 2010 – Tata McGraw Hill Education Pvt. Ltd.

E-Resource

1. <https://nptel.ac.in/courses/115/103/115103101/>
2. <https://www.youtube.com/watch?v=iMhDYarsfII>
3. <https://www.digimat.in/nptel/courses/video/112103243/L04.html>
4. <https://nptel.ac.in/courses/115/106/115106087/>
5. <https://nptel.ac.in/courses/115/105/115105046/>
6. <https://www.youtube.com/watch?v=eDCDrRzHGuE>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Core Practical		Semester – VI
Course Title : MAJOR PRACTICAL - IV		
Course Code: 06CP62	Hours Per Week : 7	Credit: 5
CIA Marks : 40	ESE Marks : 60	Total Marks : 100

Preamble

To enable the students

- To develop the practical skills by applying the laws and concepts in physics and electronics experiments.

Syllabus

(Any fourteen experiments)

- 1) Study of Logic gates – Using ICs(7408, 7400, 7404, 7432)
- 2) Verification of De Morgan's Theorem using ICs
- 3) Study of Half adder and Full adder using 7486 and 7408
- 4) Study of Half Subtractor and Full Subtractor
- 5) Rectifiers and Filters
- 6) Summing and Difference Amplifiers using IC 741
- 7) Op-Amp Schmitt triggers circuits
- 8) Square and Triangular wave generators using IC 741
- 9) Study of BCD Seven Segment Decoder
- 10) Study of Counters
- 11) Shift Registers IC 7495
- 12) Wien Bridge Oscillator
- 13) Hartley Oscillator
- 14) Colpitt's Oscillator
- 15) Phase Shift Oscillator
- 16) Multivibrator using Transistor
- 17) OP-AMP filters
- 18) Single stage Amplifier
- 19) Assembly Level Programming – Using 8085 Microprocessor Kit (Addition, Subtraction, Multiplication)
- 20) Laurent's Half shade Polarimeter – Specific Rotary power,
- 21) Ultrasonic Interferometer – Measurement of Speed in liquid

Text Book

Practical Physics and electronics – C.C.Ouseph, U.J.Rao and V.Vijayendran Viswanathan Pvt.Ltd 2007

E-Resource

1. <http://www.kctgroups.com/downloads/files/Digital-Electronics-Lab%20manual-min.pdf>
2. <https://bhagwantuniversity.ac.in/wp-content/uploads/2016/01/ELECTRONICS-LAB-II-SEM-IV.pdf>
3. http://gjucomlab.weebly.com/uploads/1/4/4/6/14464994/exp4_hartley.pdf
4. <https://godavaricoejal.ac.in/Admin/DOWNLOAD/30.pdf>
5. https://gnindia.dronacharya.info/EEE/Downloads/Labmanuals/Microprocessor_Lab_Manual.pdf
6. <https://repo.iitbhu.ac.in/db/2016/ir-2016-371/Manual-SR-Revised.pdf>
7. https://jecassam.ac.in/wp-content/uploads/2018/10/5Digital-Signal-Logic-Design-Lab_.pdf

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : DSE		Semester – VI
Course Title : QUANTUM MECHANICS & RELATIVITY		
Course Code: 06EP61	Hours Per Week : 5	Credit: 5
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

This course aims at introducing the concepts of quantum mechanics and special theory of relativity.

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Understanding the Particle Properties of Waves and the photoelectric effect	K1, K2,K3
CLO 2	Study the properties of Waves though de Broglie wave	K1, K2,K3
CLO 3	Familiarize with Schrodinger's Wave equation and to Applying for simple models.	K1, K2,K3
CLO 4	Study the Postulates of quantum mechanics and the free particle and the square well in three dimensions	K1, K2,K3
CLO 5	Understanding the theory of relativity and to Applying for length contraction, time dilation and variation of mass.	K1, K2,K3

K1- Remembering**K2-Understanding****K3-Applying****Syllabus**

UNIT-I:	Particle Properties of Waves : Introduction-Lenard's method to determine e/m for photoelectrons- Richardson and Compton experiment – experimental investigations on the photoelectric effect- Einstein's photoelectric equation-photoelectric cells	15 Hrs
UNIT-II:	Wave Properties of Particles: Introduction-Expression for group velocity- experimental study of matter waves- Heisenberg's uncertainty principle – wave mechanical atom model – mathematical proof of uncertainty principle for one dimensional wave packet	15 Hrs
UNIT- III:	Quantum Mechanics – I : Derivation of Time dependent form of Schrodinger's equation - Properties of wave function- Particle in a Box infinite Square wall - Potential Step –barrier penetration problem- Linear harmonic oscillator- Hydrogen atom (up to emergence of various quantum numbers)	15 Hrs
UNIT- IV:	Quantum Mechanics–II: Postulates of quantum mechanics – probability current density- the free particle- rectangular potential well – the square well in three dimensions	15 Hrs
UNIT- V:	Theory of Relativity Introduction - Frame of reference - Newtonian relativity - Galilean transformation equations - The Ether hypothesis - The Michelson Morley experiment - Special theory of relativity - The Lorentz transformation equations - Length contraction - Time Dilation - Relativity of simultaneity - Addition of velocity variation of Mass with Velocity - Mass Energy equilibrium - Minkowski's Four Dimensional Space (Time Continuum) - General theory of relativity	15 Hrs

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	3	1	3	1	1
CLO 2	9	3	3	1	3	1	1
CLO 3	9	3	3	3	1	1	1
CLO 4	9	3	1	3	1	1	1
CLO 5	9	3	1	3	1	1	1
Weightage of the course	45	15	11	11	9	5	5
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	9	3	3
CLO 2	9	9	9	3	3
CLO 3	9	9	9	3	9
CLO 4	9	3	9	3	9
CLO 5	9	3	9	3	9
Weightage of the course	45	33	45	15	33
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Books

Modern Physics - R. Murugesan and Kiruthiga Sivaprasath, 18th Revised Edition 2019, S. Chand & Company Ltd., New Delhi.

Unit I – 6.1 to 6.6

Unit II - 7.2, 7.3, 7.5, 7.3.1, 7.5.3, 7.5.6

Unit III – 8.1, 8.3, 8.7, 8.8, 8.9, 9.1

Unit IV -10.1, 10.2.7, 8.2, 8.5, 8.6

Unit V - 1.1 to 1.16

Reference Books

1. G. Aruldas, 2002, Quantum Mechanics, Prentice Hall of India Private Limited, New Delhi.
2. Concept of Modern Physics – Arthur Beiser – Tata MC Graw Hill, New Delhi– Sixth Edition

E-Resource

1. <https://ncert.nic.in/textbook/pdf/leph203.pdf>
2. <https://www.youtube.com/watch?v=VztSxS6rmsc>
3. <https://byjus.com/physics/relation-between-group-velocity-and-phase-velocity/>
4. <https://onlinelibrary.wiley.com/doi/pdf/10.1002/9781118148419.app1>
5. <http://vergil.chemistry.gatech.edu/notes/quantrev/node9.html>
6. https://web.iitd.ac.in/~nkrur/2013-14/Isem/cyl100/pib_sa.pdf
7. https://ocw.u-tokyo.ac.jp/lecture_files/engin_06/4/notes/en/3-1E.PDF
8. <https://faculty.etsu.edu/gardnerr/5310/5310pdf/dg2-2.pdf>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : DSE		Semester – VI
Course Title : MAINTENANCE OF ELECTRICAL AND ELECTRONIC EQUIPMENTS		
Course Code: 06EP61	Hours Per Week : 5	Credit: 5
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

This course aims at maintenance of electrical and electronic equipments.

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Know about resistors and their types and capacitor and their types	K1, K2,K3
CLO 2	Understand how to measure solution, reliability and repeatability and gain in-depth knowledge about Wheatstone bridge , get familiar idea with voltmeter and their different types	K1, K2,K3
CLO 3	Get a depth knowledge about transducers, piezoelectric transducers, resistive, capacitive and inductive transducers	K1, K2,K3
CLO 4	Know about the basic ideas about different types of modulation, antennas and their types and gain in depth knowledge about MODEM	K1, K2,K3
CLO 5	Know about general introduction to recorders and their types and get a basic knowledge on CRO,LED,LCD	K1, K2,K3

K1- Remembering**K2-Understanding****K3-Applying****Syllabus**

UNIT-I:	Electrical components: Study of electronic components - resistors - types -characteristics - materials used for resistors - resistors general specification:-maximum power rating,tolerance-temperature co-efficient - colour coding – wattage rating-potential divider arrangement-capacitors- Classification of capacitors, materials used for capacitors, capacitors specification:- capacitor working voltage, fixed capacitor-capacitive reactance-Groove board, bread board and printed circuit board	15 Hrs
UNIT-II:	Measuring instruments Basics of Measurements: Accuracy, Precision, resolution, reliability, repeatability, validity, Errors and their analysis, Standards of measurement. Bridge Measurement: DC bridges-wheat stone bridge, AC bridges – Kelvin, Hay, Maxwell, Schering and Wien bridges, Wagner ground Connection. Electronic Instruments for Measuring Basic Parameters: Amplified DC meter, AC Voltmeter, True-RMS responding Voltmeter, Electronic multi-meter, Digital voltmeter, Vector Voltmeter.	15 Hrs
UNIT- III:	Transducers Classification of transducers-basic requirements/characteristics of Transducers- Classifications of transducers-primary &	15 Hrs

	secondary, active & passive, analog and digital transducers - resistive (Potentiometer -Theory - temperature compensation & applications) -Capacitive(variable air gap type)- Inductive(LVDT)& piezoelectric transducers	
UNIT- IV:	Communication devices Basic concepts of radio transmitter and receiver – Different types of modulation - TV antennas-resonance antennas and their characteristics - Dipole antenna - Folded dipole – Yagi antenna - Yagi antenna design - Video CD player – Dish antenna - DTH system - Mobile communication system -MODEM. Telephone systems-cellular Telephone systems-FAX-mobilephone-principleofoperation-integratedservices-digitalnetworks(ISDN)	15 Hrs
UNIT- V:	Display methods and recorders Display methods and devices–different types of recorders – galvanometric recorders – pen driving system– magnetic recorders - Magnetic disk and tape - Recorders – digital recorders-digital plotters and printers,CRT display, digital CRO, LED, LCD & dot matrix display-digital storage oscilloscope-Data Loggers.	15 Hrs

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	9	1	3	1	1
CLO 2	9	3	9	1	3	1	1
CLO 3	9	3	9	1	1	1	1
CLO 4	9	3	9	1	1	1	1
CLO 5	9	3	3	1	1	1	1
Weightage of the course	45	15	30	5	9	5	5
Weighted Percentage of Course contribution to POs							

9 – Strong

3 – Medium

1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	9	3	3
CLO 2	9	9	9	3	3
CLO 3	9	9	9	3	9
CLO 4	9	3	9	3	9
CLO 5	9	3	9	3	9
Weightage of the course	45	33	45	15	33
Weighted Percentage of Course contribution to POs					

9 – Strong

3 – Medium

1 – Low

Text Books

1. Basic Electronics, R.Murugesan, S chand & Co Ltd, 2010 Edition
- 2.Text book-A course in Electrical & Electronics Measurement and Instrumentation , A K.Sawhney, Puneet Sawhney, Dhanpat Rai Publications, 2004 Edition

Reference Books

1. Principles of Electronics, VK Mehta, S Chand & Co, 2001 (5) edition
2. Functional Electronics, V.K. Ramanan, McGraw-Hill Inc, 1984 (1), edition
3. Integrated electronics, K.K. Tewari, S. Chand Publishing, 1995 (Revised) edition
4. Electronic principles, Halliday Rhennick Walker, Willey Publication.

E-Resource

1. <https://nptel.ac.in/courses/122/106/122106025/>
2. <https://nptel.ac.in/courses/108/105/108105153/>
3. <https://www.youtube.com/watch?v=luPTYjxZzyo>
4. <https://nptel.ac.in/courses/117/102/117102059/>
5. <https://nptel.ac.in/courses/108/105/108105132/>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Skill Based Theory		Semester – VI
Course Title : NANOTECHNOLOGY		
Course Code: 06SB61	Hours Per Week : 2	Credit: 2
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To gain more knowledge about nanomaterials, nanocomposite, synthesis techniques and characteristics tools.

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Understanding the fundamentals of Nanotechnology	K1, K2,K3
CLO 2	Familiarize the various concept of Crystal bonding and its structures.	K1, K2,K3
CLO 3	Give a growth techniques of nanomaterials	K1, K2,K3
CLO 4	Impart basic knowledge on characterization techniques involved in nanotechnology	K1, K2,K3
CLO 5	Understanding the applications of nanotechnology in various fields.	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	Introduction – Nanotechnology – Nanomaterials – Types of nanomaterials –Properties of Nanomaterials	(6 Hrs)
UNIT-II	Crystal structure – Crystal bonding –Crystal growth – Some important Crystal structure – Rock salt – Wurtzite- Fluortie – Rutile – Cristobalite- Spinel	(6 Hrs)
UNIT- III	Synthesis Process - Growth techniques of nanomaterials – Role of Bottom-up and Top-Down approaches in nanotechnology-Sol gel process – Electrodeposition- Sputtering-Spray pyrolysis.	(6 Hrs)
UNIT- IV	Characterization Techniques - Characterization tools of nanomaterials – XRD – SEM- UV-Visible spectroscopy – Photoluminescence Spectroscopy.	(6 Hrs)
UNIT- V	Nanocomposite - Carbon nanotubes - Nanocomposite – Types of nanocomposite – Application of nanomaterial's	(6 Hrs)

Text Book

Study Material provided by department of Physics

Reference Books

Introduction to Nanoscience and Nanotechnology – K.K.Chattopadhyay , A.N. Banerjee – PHI Learning Pvt. Ltd – 2012 Edition

E-Resource

1. <https://www.twi-global.com/technical-knowledge/faqs/what-is-a-nanomaterial>
2. <https://www.acadpubl.eu/hub/2018-119-12/articles/2/489.pdf>
3. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Book%3A_Physical_Methods_in_Chemistry_and_Nano_Science_\(Barron\)/07%3A_Molecular_and_Solid_State_Structure/7.01%3A_Crystal_Structure](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Book%3A_Physical_Methods_in_Chemistry_and_Nano_Science_(Barron)/07%3A_Molecular_and_Solid_State_Structure/7.01%3A_Crystal_Structure)
4. <https://youtu.be/etP9xr1bXqk>
5. <https://ccsuniversity.ac.in/bridge-library/pdf/L-3%20Synthesis%20of%20Nanostructured%20Materials%20Prof%20BPS.pdf>

-
6. <https://www.slideshare.net/GaneshanS4/sem-tem-nanotechnology>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Skill Based Theory		Semester –VI
Course Title : PHYSICS FOR COMPETITIVE EXAMINATIONS		
Course Code: 06SB62	Hours Per Week : 2	Credit: 2
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

- To enable the students to get through in various physics based competitive examinations like, Entrance examinations for higher studies and Government service
- To enhance the Understanding of basic principles and ideas of physics concepts, and to improve reasoning
- To familiarize solving objective type questions from various areas of Physics like Mechanics, Properties of matter, Thermodynamics, Optics, Sound, Electricity, Magnetism, Electronics and Modern Physics

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Familiarize various concepts of mechanics and properties of matter for problem solving	K1, K2,K3
CLO 2	Applying various principles of thermodynamics and optics for solving problems	K1, K2,K3
CLO 3	Solve problems in electricity and magnetism	K1, K2,K3
CLO 4	Gain knowledge about modern physics for solving competitive exams questions	K1, K2,K3
CLO 5	Understanding the basic concepts of nuclear physics and electronics for Applying them to solve problems	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I:	Mechanics and Properties of Matter Units of physical quantities and their dimensions – Particle dynamics, projectiles, conservation laws and collision two bodies – Circular motion, Rotating frames of reference, Conical and Foucault's pendulum – Rotational motion, Centre of mass, moment of inertia – Simple Harmonic motion and Harmonic oscillator – Gravitation, Escape velocity & Artificial satellites – Mechanics of fluids: Surface tension & Viscosity – Elasticity	6 Hrs
UNIT-II:	Thermodynamics and Optics Inter molecular forces, Kinetic theory of gases and behaviour of real gases – Laws of thermodynamics – Conduction & Radiation – Nature of light – Interference – Diffraction, Resolving power & Polarization – Geometrical optics and Aids to vision – Superposition of waves – Doppler's effect	6 Hrs
UNIT- III:	Electricity and Magnetism Magnetic properties of matter – Electrostatics – Electric potential – Capacity and Capacitors – Kirchhoff's Laws and steady current – Magnetic effects of current – Potentiometer & Thermoelectricity – Electromagnetic induction – Heating & Chemical effects of current – Alternating current	6 Hrs

UNIT- IV:	Modern Physics Atomic structure and positive rays – X rays and photoelectric effect – Matter waves, uncertainty principle, wave mechanics and special theory of relativity	6 Hrs
UNIT- V:	Nuclear Physics and Electronics Radioactivity and Atomic Nucleus -Electronics and semiconductors – Solids – Universe-Digital Integrated Circuits	6 Hrs

Text Books

1.Objective Physics by Dr. S.L. Kakani, Sultan Chand & Sons, New Delhi, 6th Edition, 1995

UNIT I: Chapters 1-9 Pages 72 to 285

UNIT II: Chapters 13-22 Pages 320 to 513

UNIT III: Chapters 24-31 Pages 540 to 689

UNIT IV: Chapters 32-34 Pages 690 to 759

UNIT V: Chapters 35-39 Pages 760 to 871

Reference Books

1. Physics, Volume 1 and 2, David Halliday, Robert Resnick , Kenneth S. Krane 2002, 5th Edition, John Wiley & Sons, INC.
2. Concepts of Modern Physics – Arthur Beiser, Shobhit Mahajan, S.Rai Choudhury 6th Edition, 2010 – Tata McGraw Hill Education Pvt. Ltd.

E-Resource

1. <https://www.examsbook.com/physics-questions-and-answers>
2. <https://www.examrace.com/Study-Material/Physics/Physics-Electricity.html>
3. <https://www.examrace.com/Study-Material/Physics/Physics-Electromagnetic-Waves.html>
4. <https://www.examrace.com/Study-Material/Physics/Physics-Formula.html>
5. <https://www.examrace.com/Study-Material/Physics/Physics-Magnetism-Current.html>
6. <https://www.examrace.com/Study-Material/Physics/>
7. <https://www.sawaal.com/general-knowledge/physics-questions-and-answers.html>

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : Skill Based Theory		Semester – VI
Course Title : MEDICAL INSTRUMENTATION		
Course Code: 06SB63	Hours Per Week : 2	Credit: 2
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

To learn basic design principles of medical instruments

- know about electrocardiography
- Study about electroencephalography
- gain knowledge about operation theatre requirement
- provide in depth study lasers, MRI, PET

Course Learning Outcomes (CLOs)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Learn basic design principles of Medical Instruments and their components	K1, K2,K3
CLO 2	Know about Electrocardiography – Principles, Lead configuration	K1, K2,K3
CLO 3	Study about Electroencephalography – Brain waves, Placement of Electrodes and Analysis	K1, K2,K3
CLO 4	Gain knowledge about Operation Theatre Equipments, Surgical diathermy	K1, K2,K3
CLO 5	Provide in-depth study of Bio-Medical Instrumentation like Lasers, Nuclear Imaging Techniques, Magnetic Resonance Imaging, Positron Emission Tomography	K1, K2,K3

K1- Remembering

K2-Understanding

K3-Applying

Syllabus

UNIT-I	MEDICAL INSTRUMENTS: Introduction – Design of Medical Instruments – Components of Bio-Medical Instrument system	(6 Hrs)
UNIT-II	ELECTROCARDIOGRAPHY (ECG): Origin of cardiac action potential ECG lead configuration – Block diagram of ECG Recording set up	(6 Hrs)
UNIT- III	ELECTROENCEPHALOGRAPHY (EEG): Origin of EEG – Brain waves - Placement of electrodes – Recording set up – Analysis of EEG	(6 Hrs)
UNIT- IV	OPERATION THEATRE EQUIPMENT: Introduction – Surgical diathermy – Ventilators – Anesthesia machine	(6 Hrs)
UNIT- V	ADVANCES IN BIOMEDICAL INSTRUMENTATION: Lasers in Medicine(Basic principle of Laser action, Laser instrumentation, Advantages of Laser surgery) – Nuclear Imaging Techniques – Magnetic Resonance Imaging (MRI) – (Magnetic Resonance phenomenon- MRI instrumentation) – Positron Emission Tomography(PET)	(6 Hrs)

Text Book

1. Bio-Medical Instrumentation – Dr.M. Arumugam
Anuradha Publications, Kumbakonam – Tenth Reprint-2006

Chapters:

- Unit I: 2.1 – 2.3 Unit II: 4.1, 4.3 Unit III: 4.4
Unit IV: 6.1, 6.2, 6.8, 6.9 Unit V: 10.3
(Basic principle of Laser action, Laser instrumentation, Advantages of Laser surgery), 10.6, 10.10.1, 10.10.8, 10.11

Reference Books

1. Bio-Medical Electronics & Instrumentation – Prof. S.K. Venkata Ram

E-Resource

1. <https://www.youtube.com/watch?v=xIZQRjkwV9Q>
2. <https://www.nhs.uk/conditions/electrocardiogram/>
3. <https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/electroencephalogram-ecg>
4. <https://www.healthline.com/health/ventilator>
5. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3821260/>
6. <https://www.lecturio.com/magazine/anesthesia-machine/>
7. <https://www.medicalnewstoday.com/articles/146309#what-is-an-mri-scan>
8. <https://www.youtube.com/watch?v=nFkBhUYynUw>
9. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1126321/>
10. <https://www.youtube.com/watch?v=yrTy03O0gWw>
11. https://www.medicinenet.com/ct_scan_vs_mri/article.htm
12. <https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/ct-vs-mri-vs-xray>

