

# **Sadakathullah Appa College**

**(Autonomous)**

**(Reaccredited by NAAC at an 'A' Grade and ISO 9001:2015 Certified Institution)**

**Rahmath Nagar, Tirunelveli – 627 011, Tamil Nadu.**

## **DEPARTMENT OF PHYSICS**



### **CBCS SYLLABUS**

**For**

## **B.Sc. Physics**

**(Applicable for students admitted in June 2019 and onwards)  
(As per the Resolutions of the Academic Council Meetings  
held on 03-03-2018, 17-10-2018 and 02-03-2019).**



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<b>B.Sc. Physics (2018 – 2021 Onwards)</b> <b>(Applicable for students admitted in June 2019 and onwards)</b> <b>With Allied Chemistry and Mathematics</b>						
<b>DISTRIBUTION OF CREDITS, NO. OF PAPERS &amp; MARKS</b>						
<b>Part</b>	<b>Course</b>	<b>Semester</b>	<b>Hours</b>	<b>Credits</b>	<b>Papers</b>	<b>Marks</b>
<b>I</b>	Tamil / Arabic	I to IV	24	16	4	400
<b>II</b>	English	I to IV	24	16	5	400
<b>III</b>	Discipline Specific Core (DSC) + Project + Practicals	I to VI	78	62	20	1800
	Discipline Specific Elective (DSE)	III to VI	16	16	4	400
	Allied Theory + Practicals	I to IV	24	16	6	500
<b>IV</b>	Non-major Elective (NME)	III & IV	4	4	2	200
	Skill Enhancement Course (SEC)	V & VI	4	4	2	200
	Skill Based Common (SBC)	VI	2	2	1	100
	Ability Enhancement Compulsory Course (AECC) - Environmental Studies (EVS)	I	2	2	1	100
	Value Education (VE)	II	2	2	1	100
<b>V</b>	Extension Activities	I to IV+	--	1+1*	1	100
	MOOC\$	I – V	-	2#		
<b>TOTAL</b>			<b>180</b>	<b>141+1*+2#</b>	<b>47</b>	<b>4300</b>

#### SEMESTER WISE DISTRIBUTION OF HOURS

<b>Part</b>	<b>I</b>	<b>II</b>	<b>III</b>				<b>IV</b>				<b>Total</b>
<b>SEM</b>	<b>T/A</b>	<b>ENG</b>	<b>DSC</b>	<b>PRO/ FW</b>	<b>DSE</b>	<b>AL</b>	<b>NME</b>	<b>SEC</b>	<b>SBC</b>	<b>EVS/VE</b>	
<b>I</b>	6	6	10	-	-	6	-	-	-	2	<b>30</b>
<b>II</b>	6	6	10	-	-	6	-	-	-	2	<b>30</b>
<b>III</b>	6	6	6	-	4	6	2	-	-	-	<b>30</b>
<b>IV</b>	6	6	6	-	4	6	2	-	-	-	<b>30</b>
<b>V</b>	-	-	24	-	4	-	-	2	-	-	<b>30</b>
<b>VI</b>	-	-	16	6	4	-	-	2	2	-	<b>30</b>
<b>Total</b>	<b>24</b>	<b>24</b>	<b>72</b>	<b>6</b>	<b>16</b>	<b>24</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>4</b>	<b>180</b>

+ Activities and evaluation are to be performed during Semesters I to IV and results to be declared at the end of the Semester IV along with those for other courses in the Mark Statement.

\* Extra credit for Sadakath Outreach Programme (SOP)

\$ As per the guidelines of the UGC all the UG and the PG students shall enroll for one Massive Open Online Course offered through SWAYAM, NPTEL, etc.

# Two extra credits will be given on completion of the course.

**B.Sc. Physics (2018-2021)**  
**(Applicable for students admitted in June 2019 and onwards)**  
**TITLE OF THE PAPERS, CREDITS & MARKS**

<b>I SEMESTER</b>								
<b>P</b>	<b>SUB</b>	<b>TITLE OF THE PAPER</b>	<b>S. CODE</b>	<b>H/W</b>	<b>C</b>	<b>MARKS</b>		
						<b>I</b>	<b>E</b>	<b>T</b>
<b>I</b>	TA 1	இக்காலத் தமிழ்	18ULTA11	6	4	25	75	100
	AR 1	Applied Grammar and Translation – I	18ULAR11					
<b>II</b>	EN 1A	Prose, Poetry and Grammar-I	18ULEN11	4	2	25	75	100/2
	EN 1B	English for Communication	18ULEC11	2	2	25	75	100/2
<b>III</b>	DSC 1	Thermal Physics	18UCPH11	4	4	25	75	100
	DSC 2	Basic Physics	18UCPH12	4	4	25	75	100
	AI 1	Statistics and Calculus	18UAMA11	6	4	25	75	100
	CP 1	Core Physics Practicals - I	18UCPH1P1	2	1	40	60	100/2
<b>IV</b>	EVS	Environmental Studies	18UENS11	2	2	25	75	100
<b>TOTAL</b>				<b>30</b>	<b>23</b>			<b>650</b>
<b>II SEMESTER</b>								
<b>I</b>	TA 2	சமயத் தமிழ்	18ULTA21	6	4	25	75	100
	AR 2	Applied Grammar and Translation – II	18ULAR21					
<b>II</b>	EN 2	Prose, Poetry and Grammar - II	18ULEN21	6	4	25	75	100
<b>III</b>	DSC 3	Physical optics and Spectroscopy	18UCPH21	4	4	25	75	100
	DSC 4	Mechanics and Astrophysics	18UCPH22	4	4	25	75	100
	AI 2	Algebra & Differential Equations	18UAMA21	6	4	25	75	100
	CP 2	Core Physics Practicals - II	18UCPH2P1	2	1	40	60	100/2
<b>IV</b>	VE 1	Value Education-I	18USVE2A	2	2	25	75	100
	VE 2	Value Education-II	18USVE2B					
<b>TOTAL</b>				<b>30</b>	<b>23</b>			<b>650</b>
<b>III SEMESTER</b>								
<b>I</b>	TA 3	பயன்பாட்டுத் தமிழ்	18ULTA31	6	4	25	75	100
	AR 3	Applied Grammar and Translation-III	18ULAR31					
<b>II</b>	EN 3	One-Act Plays and Writing Skill	18ULEN31	6	4	25	75	100
<b>III</b>	DSC 5	Electricity and Magnetism	18UCPH31	4	4	25	75	100
	DSE1A	Introduction to Computers	18UEPH3A	4	4	25	75	100
	DSE1B	Radiation safety	18UEPH3B					
	AII 1	Allied Chemistry- I	18UACH31	4	3	25	75	100
	CP 3	Core Physics Practicals - III	18UCPH3P1	2	1	40	60	100/2
	AII P1	Inorganic Qualitative Analysis	18UACH3P1	2	1	40	60	100/2
<b>IV</b>	NME-I	Laser Physics	18UNPH31	2	2	25	75	100
<b>TOTAL</b>				<b>30</b>	<b>23</b>			<b>700</b>

IV SEMESTER								
P	SUB	TITLE OF THE PAPER	S. CODE	H/W	C	MARKS		
						I	E	T
I	TA 4	சங்கத் தமிழ்	18ULTA41	6	4	25	75	100
	AR 4	Classical Prose	18ULAR41					
II	EN 4	A Practical Course in Spoken English	18ULEN41	6	4	25	75	100
III	DSC 6	Laser and its Applications	18UCPH41	4	4	25	75	100
	DSE2A	Programming in C++	18UEPH4A	4	4	25	75	100
	DSE2B	Mathematical Physics	18UEPH4B					
	AII 2	Allied Chemistry - II	18UACH41	4	3	25	75	100
	CP 4	Core Physics Practicals - IV	18UCPH4P1	2	1	40	60	100/2
	AII P2	Inorganic Quantitative Analysis	18UACH4P1	2	1	40	60	100/2
IV	NME-II	Applied Physics	18UNPH41	2	2	25	75	100
V	EX	Extension Activities (Choose from the list)	--	--	1	--	100	100
		SOP	18UEXSOP		1*			
TOTAL				30	24 +1*			800
V SEMESTER								
III	DSC 7	Modern Physics	18UCPH51	6	4	25	75	100
	DSC 8	Basic Electronics	18UCPH52	5	4	25	75	100
	DSC 9	Digital Electronics	18UCPH53	5	4	25	75	100
	DSE3A	Introduction to Nanotechnology	18UEPH5A	4	4	25	75	100
	DSE3B	Microprocessor	18UEPH5B					
	CP 5	Core Physics Practicals-V	18UCPH5P1	4	2	40	60	100
	CP 6	Core Physics Practicals-VI	18UCPH5P2	4	2	40	60	100
IV	SEC I	Medical Physics	18USPH51	2	2	25	75	100
TOTAL				30	22			700
VI SEMESTER								
III	DSC 10	Quantum Mechanics and Statistical Mechanics	18UCPH61	4	4	25	75	100
	DSC 11	Solid State Physics	18UCPH62	4	4	25	75	100
	DSC 12	Project	18UCPH63	6	6	25	75	100
	DSE4A	Communication Electronics	18UEPH6A	4	4	25	75	100
	DSE4B	Computer Oriented Numerical Method	18UEPH6B					
	CP 7	Core Physics Practicals-VII	18UCPH6P1	4	2	40	60	100
	CP 8	Core Physics Practicals-VIII	18UCPH6P2	4	2	40	60	100
IV	SEC II	Energy Physics	18USPH61	2	2	25	75	100
	SBC	Personality Development	18USPD62	2	2	25	75	100
TOTAL				30	26			800
I-V Sem		Massive Open Online Course \$		-	2 <sup>#</sup>			

## B.Sc. Physics (2018-2021) Course Structure (CBCS)

(Applicable for students admitted in June 2019 and onwards)

### PART I AND PART II SUBJECTS

#### TITLE OF THE PAPERS, CREDITS & MARKS

GROUP II COURSES (TWO YEAR LANGUAGE COURSES) (B.A. Arabic, B.A. Tamil, B.A. English, B.A. History, B.Sc. Mathematics, B.Sc. Physics, B.Sc. Chemistry, B.Sc. Zoology, B.Sc. Microbiology and B.Sc. Nutrition and Dietetics)								
SEM	Title of the paper	S. CODE	H/W	C	I	E	T	
<b>PART I – TAMIL</b>								
<b>I</b>	இக்காலத் தமிழ்	<b>18ULTA11</b>	6	4	25	75	100	
<b>II</b>	சமயத் தமிழ்	<b>18ULTA21</b>	6	4	25	75	100	
<b>III</b>	பயன்பாட்டுத் தமிழ்	<b>18ULTA31</b>	6	4	25	75	100	
<b>IV</b>	சங்கத் தமிழ்	<b>18ULTA41</b>	6	4	25	75	100	
<b>TOTAL</b>			<b>24</b>	<b>16</b>			<b>400</b>	
<b>PART I – ARABIC</b>								
<b>I</b>	Applied Grammar and Translation – I	<b>18ULAR11</b>	6	4	25	75	100	
<b>II</b>	Applied Grammar and Translation – II	<b>18ULAR21</b>	6	4	25	75	100	
<b>III</b>	Applied Grammar and Translation – III	<b>18ULAR31</b>	6	4	25	75	100	
<b>IV</b>	Classical Prose	<b>18ULAR41</b>	6	4	25	75	100	
<b>TOTAL</b>			<b>24</b>	<b>16</b>			<b>400</b>	
<b>PART II – ENGLISH</b>								
<b>I</b>	Prose, Poetry and Grammar-I	<b>18ULEN11</b>	4	2	25	75	100/2	
	English for Communication	<b>18ULEC11</b>	2	2	25	75	100/2	
<b>II</b>	Prose, Poetry and Grammar-II	<b>18ULEN21</b>	6	4	25	75	100	
<b>III</b>	One – Act Plays and Writing Skill	<b>18ULEN31</b>	6	4	25	75	100	
<b>IV</b>	A Practical Course in Spoken English	<b>18ULEN41</b>	6	4	25	75	100	
<b>TOTAL</b>			<b>24</b>	<b>16</b>			<b>400</b>	



**PART III**

Part III DSC, DSE, Project and SEC								
SEM	No.	TITLE OF THE PAPER	S. CODE	H/W	C	MARKS		
						I	E	T
I	DSC1	Thermal Physics	18UCPH11	4	4	25	75	100
	DSC2	Basic Physics	18UCPH12	4	4	25	75	100
	CP 1	Physics Practicals-I	18UCPH1P1	2	1	20	30	50
II	DSC3	Physical optics and Spectroscopy	18UCPH21	4	4	25	75	100
	DSC4	Mechanics and Astrophysics	18UCPH22	4	4	25	75	100
	CP 2	Physics Practicals-II	18UCPH2P1	2	1	20	30	50
III	DSC5	Electricity and Magnetism	18UCPH31	4	4	25	75	100
	CP 3	Physics Practicals-III	18UCPH3P1	2	1	20	30	50
	DSE-I	Introduction to Computers	18UEPH3A	4	4	25	75	100
		Radiation safety	18UEPH3B					
IV	DSC6	Laser and its Applications	18UCPH41	4	4	25	75	100
	CP 4	Physics Practicals-IV	18UCPH4P1	2	1	20	30	50
	DSE-II	Programming in C++	18UEPH4A	4	4	25	75	100
		Mathematical Physics	18UEPH4B					
V	DSC7	Modern Physics	18UCPH51	6	4	25	75	100
	DSC8	Basic Electronics	18UCPH52	5	4	25	75	100
	DSC9	Digital Electronics	18UCPH53	5	4	25	75	100
	CP 5	Physics Practicals-V	18UCPH5P1	4	2	40	60	100
	CP 6	Physics Practicals-VI	18UCPH5P2	4	2	40	60	100
	DSE-III	Introduction to Nanotechnology	18UEPH5A	4	4	25	75	100
		Microprocessor	18UEPH5B					
VI	DSC10	Quantum Mechanics and Statistical Mechanics	18UCPH61	4	4	25	75	100
	DSC11	Solid State Physics	18UCPH62	4	4	25	75	100
	DSC12	Project	18UCPH63	6	6	25	75	100
	CP 7	Physics Practicals-VII	18UCPH6P1	4	2	40	60	100
	CP 8	Physics Practicals-VIII	18UCPH6P2	4	2	40	60	100
	DSE-IV	Communication Electronics	18UEPH6A	4	4	25	75	100
		Computer Oriented Numerical method	18UEPH6B					
TOTAL				94	78			2200

**PART III – ALLIED I – MATHEMATICS & ALLIED – II CHEMISTRY**

SEM	SUB	TITLE OF THE PAPER	S. CODE	H/W	C	MARKS		
						I	E	T
<b>I</b>	AI-1	Statistics and Calculus	18UAMA11	6	4	25	75	100
<b>II</b>	AI-2	Algebra & Differential Equations	18UAMA21	6	4	25	75	100
<b>III</b>	AII-1	Allied Chemistry – I	18UACH31	4	3	25	75	100
	AII-P1	Inorganic Qualitative Analysis	18UACH3P1	2	1	20	30	50
<b>IV</b>	AII-2	Allied Chemistry – II	18UACH41	4	3	25	75	100
	AII-P2	Inorganic Quantitative Analysis	18UACH4P1	2	1	20	30	50
<b>TOTAL</b>				<b>24</b>	<b>16</b>			<b>500</b>

**Part IV – NON-MAJOR ELECTIVE COURSE (FOR OTHER MAJOR STUDENTS)**

SEM	P	TITLE OF THE PAPER	S. CODE	H/W	C	MARKS		
						I	E	T
III	NME-I	Laser Physics	18UNPH31	2	2	25	75	100
IV	NME-II	Applied Physics	18UNPH41	2	2	25	75	100
TOTAL				4	4			200
Part IV – SEC/SBC								
V	SEC-I	Medical Physics	18USPH51	2	2	25	75	100
VI	SEC-II	Energy Physics	18USPH61	2	2	25	75	100
VI	SBC	Personality Development	18USPD62	2	2	25	75	100
TOTAL				6	6			300
Part IV – EVS & Value Education								
I	EVS	Environmental Studies	18UENS11	2	2	25	75	100
II	VE	Value Education I	18USVE2A	2	2	25	75	100
		Value Education II	18USVE2B					
TOTAL				4	4			200

**PART – V – Extension Activities**

SEM	Extension Activities (Choose anyone)	S. CODE	H/W	C	MARKS		
					I	E	T
<b>I to IV</b>	NCC	18UEXNCC		<b>1</b>			<b>100</b>
	NSS	18UEXNSS					
	Physical Education	18UEXPHE					
	Red Ribbon Club	18UEXRRC					
	Youth Red Cross	18UEXYRC					
	Youth Welfare	18UEXYWL					
	Yoga	18UEXYOG					
<b>III-IV</b>	Sadakath Outreach Programme (SOP)	18UEXSOP		<b>1*</b>			
	<b>Total</b>		-	<b>1+ 1*</b>			<b>100</b>

முதல் பருவம்			
PART - 1 TAMIL			
TA 1	இக்காலத் தமிழ்		18ULTA11
Hrs/Week: 6	Hrs/Sem: 90	Hrs/Unit: 18	Credits:4

நோக்கம்

1. தமிழ்ப்படைப்பிலக்கியங்களான புதுக்கவிதைகள், சிறுகதைகள் ஆகியவற்றை எழுத வைத்தல்
2. சமூகம் பற்றிய சிந்தனைகளைப் படைப்பிலக்கியங்கள் மூலம் ஏற்படுத்துதல்.

**அலகு - 1 தமிழ்க் கவிதைகள்**

- |                                      |   |                            |
|--------------------------------------|---|----------------------------|
| 1. பரம்பொருள் வாழ்த்து               | - | மகாகவிபாரதியார்            |
| 2. தமிழின் இனிமை                     | - | பாவேந்தர் பாரதிதாசன்       |
| 3. கொக்கு                            | - | ந. பிச்சமூர்த்தி           |
| 4. நான்                              | - | தருமு சிவராம் (பிரமிள்)    |
| 5. முக்காலம்                         | - | சி. மணி                    |
| 6. தோழர் மோசிகிரனார்                 | - | ஞானக்கூத்தன்               |
| 7. நகுலன் கவிதைகள்                   | - | நகுலன்                     |
| 8. எதிர்வரும் யாவரும்                | - | கல்யாண்ஜி                  |
| 9. ஆயிரம் திருநாமம் பாடி             | - | கவிக்கோ அப்துல் ரகுமான்    |
| 10. மரங்களைப் பாடுவேன்               | - | வைரமுத்து                  |
| 11. இளைய தோழனுக்கு                   | - | மு. மேத்தா                 |
| 12. செய்யுள்                         | - | கலாப்ரியா                  |
| 13. பெயர் தெரியாப்பறவை               | - | தேன்மொழிதாஸ்               |
| 14. நிசப்த்தத்தில் குளிரும் வார்த்தை | - | அனார்                      |
| 15. முதல்துளி                        | - | பாலைவன லாந்தர்             |
| 16. இந்தக்காலம்                      | - | மனுஷ்யபுத்திரன்            |
| 17. பூவின் பதில்                     | - | நாகூர் ருமி                |
| 18. அறிவுமதி கவிதைகள்                | - | அறிவுமதி                   |
| 19. வேர் பிடித்த மரம்                | - | க. அம்சப்ரியா              |
| 20. நட்சத்திரக் கிழவி                | - | ப.சுடலைமணி                 |
| 21. கீதாஞ்சலி                        | - | மகாகவி இரவீந்தரநாத் தாகூர் |
| 22. ஜென் கவிதைகள்                    | - | பாஷோ                       |

**அலகு - 2 சிறுகதை இன்பம்**

- |                         |   |                          |
|-------------------------|---|--------------------------|
| 1. விடியுமா?            | - | கு.பா.ராஜகோபாலன்         |
| 2. காலனும் கிழவியும்    | - | புதுமைப்பித்தன்          |
| 3. கதவு                 | - | கி.ராஜநாராயணன்           |
| 4. காலத்தின் ஆவர்த்தனம் | - | தோப்பில் முஹம்மது மீரான் |
| 5. சொர்க்கக் கன்னிகை    | - | கருணா மணாளன்             |
| 6. செடிகளுக்கு          | - | வண்ணதாசன்                |
| 7. கனவில் உதிர்ந்த பூ   | - | நாறும்பூநாதன்            |
| 8. சங்காத்தி            | - | தீன்                     |
| 9. ராஜமீன்              | - | கீரனூர் ஜாகீர்ராஜா       |

**அலகு - 3 கட்டுரைக் கனிகள்**

1. தமிழில் ஹைக்குகவிதைகள்
2. கவிக்கோ அப்துல் ரகுமானின் கவிதைகள்
3. நாட்டுப்புற இலக்கியங்கள்
4. இணையத்தில் தமிழ்
5. தமிழ்ச் சிறுகதை இலக்கியம்
6. இயற்கையைக் கொண்டாடும் ஜென் கவிதைகள்

**அலகு - 4 இலக்கியவரலாறு**

1. தமிழ்ப் புதுக்கவிதை தோற்றமும் வளர்ச்சியும்
2. தமிழ்ச் சிறுகதை தோற்றமும் வளர்ச்சியும்
3. தற்காலச் சிறுகதையாசிரியர்கள் ஓர் அறிமுகம்
4. புதுக்கவிதைகள் எழுதப்பயிற்சி தந்து மாணவர் கவிதைத் தொகுப்பை வெளியிடல்.

**அலகு - 5 எழுத்து இலக்கணம் & எழுத்து வகைகள் அறிமுகம்**

1. முதலெழுத்துகள், சார்பெழுத்துகள், சுட்டெழுத்துக்கள், வினாவெழுத்துகள்
2. மொழி முதல் எழுத்துகள், மொழி இறுதி எழுத்துகள், வல்லினம் மிகுமிடங்கள், வல்லினம் மிகாவிடங்கள்.
3. நாளிதழ்களில் இடம் பெறும் செய்திகளில் பிழைகளைக் கண்டறிந்து எழுதப்பயிற்சி

**பாடநூல்**

**“இன்பத்தமிழ்”**

சதக்கத்துல்லாஹ் அப்பா கல்லூரித் தமிழ்த்துறை வெளியீடு  
ரஹ்மத்நகர், திருநெல்வேலி & 627 011.

**பார்வை நூல்கள் மற்றும் வழிகாட்டு இணையதளங்கள்**

1. வல்லிக்கண்ணன்  
புதுக்கவிதை தோற்றமும் வளர்ச்சியும்
2. ந.சு ப்புரெட்டியார்  
புதுக்கவிதை போக்கும் நோக்கம்
3. பேராசிரியர் சு. பாலசுந்திரன்  
புதுக்கவிதை & ஒரு புதுப்பார்வை
4. எஸ். ராமகிருஷ்ணன்  
கதாவிலாசம்  
விகடன் பிரசுரம்  
757, அண்ணாசாலை  
சென்னை & 600 002.

**இணையதளங்கள்**

1. [www.tamilvu.org](http://www.tamilvu.org)
2. [www.azhiyasudargal.blogspot.in](http://www.azhiyasudargal.blogspot.in)
3. [www.neelamegam.blogspot.in](http://www.neelamegam.blogspot.in)
4. [www.jeyamohan.in](http://www.jeyamohan.in)
5. [www.sramakrishnan.com](http://www.sramakrishnan.com)

SEMESTER - I			
AR 1	APPLIED GRAMMAR AND TRANSLATION-I		18ULAR11
Hrs/ Week: 6	Hrs/ Sem: 90	Hrs/ Unit: 18	Credits: 4

**Objectives:** To enable the students to learn Alphabets, Pronunciation, Basic Grammar, Reading, Writing of Arabic Language

**UNIT I: Lessons 1 to 4 (Textbook – 1)**

من الدرس الأول إلى الدرس الرابع

**UNIT II: Lessons 5 to 8 (Textbook – 1)**

من الدرس الخامس إلى الدرس الثامن

**UNIT III: Grammar Portions (Textbook – 2)**

- 1) Words and the types of words (أجزاء الكلام)
- 2) Nominal Sentence (الجملة الاسمية)
- 3) Adjective and Noun-qualified (الصفة والموصوف)
- 4) Subject and Predicate
- 5) Masculine and Feminine (المذكر والمؤنث)
- 6) Interrogatives (أدوات الاستفهام)
- 7) Singular, Dual and Feminine (المفرد والتثنية والجمع)
- 8) Possessiveness (المضاف والمضاف إليه)
- 9) Detached Pronouns (الضمائر المنفصلة)
- 10) Prepositions (حروف الجر)
- 11) Demonstrative pronouns (أسماء الإشارة)
- 12) Relative pronouns (الأسماء الموصولة)

**UNIT IV: Lessons 9 to 12 (Textbook – 1)**

من الدرس التاسع إلى الدرس الثاني عشر

**UNIT V: Lessons 13 to 16 (Textbook – 1)**

من الدرس الثالث عشر إلى الدرس السادس عشر

### TEXTBOOKS

- 1) Duroosul Lughatil Arabiya Part – I Lessons 1 to 16 only by Dr. V. Abdur Rahim. Available at: Islamic foundation Trust, 78 Perambur High Road, Perambur, Chennai- 600 012.
- 2) Arabic for Beginners (selected topics only) By Dr. Syed Ali (Former HOD of Arabic, The New College, Royappettach, (Chennai) (International Edition 2001) (UBS Publishers & Distributors Ltd) 5, Ansari Road New Delhi -110 002.

<b>I SEMESTER</b> <b>Part – II English</b>			
<b>EN 1A</b>	<b>Prose, Poetry and Grammar - I</b>		<b>18ULEN11</b>
<b>Hrs/ Week: 4</b>	<b>Hrs/ Sem: 60</b>	<b>Hrs/ Unit: 12</b>	<b>Credits:2</b>

**Objectives:**

- To answer comprehensive questions on passages of moderate level of difficulty.
- To write a critical appreciation of the prescribed poems.
- To write grammatically.

**UNIT I: PROSE**

1. Education Provides a Solid Foundation - A.P. J. Abdul Kalam
2. Love Story - Maneka Gandhi

**UNIT II: PROSE**

3. Speech on Indian Independence - Jawaharlal Nehru
4. Film-Making - Satyajit Ray

**UNIT III: POETRY**

1. In the Bazaars of Hyderabad - Sarojini Naidu
2. Middle Age - Kamala Das

**UNIT IV: GRAMMAR**

1. Parts of Speech: Verb
2. Tenses

**UNIT V: COMMUNICATION SKILLS**

1. Unseen Passages
2. Letter Writing: Personal and Business Letters
3. Curriculum Vitae (CV)

**TEXTBOOK:**

Kulat L. Ambadas, Dr. Joshi, Sandeep. et. al. (ed).  
*Blooming Buds*. Hyderabad: Orient Black Swan, 2017.

<b>I SEMESTER</b>			
<b>EN 1B</b>	<b>ENGLISH FOR COMMUNICATION</b>		<b>18ULEC11</b>
<b>Hrs/ Week: 2</b>	<b>Hrs/ Sem: 30</b>	<b>Hrs/ Unit: 6</b>	<b>Credits:2</b>

**Objectives:**

1. To teach students basic Grammatical categories.
2. To teach students the four skills viz. Listening, Speaking, Reading and Writing and to impart language skills through tasks.
3. To inculcate in students the skills necessary for social and academic circumstances.

**UNIT I**

Parts of Speech (Pages 5 to 17)

**UNIT II**

Listening and Speaking (Pages 22 to 34) and (56 to 59)

**UNIT III**

Reading (Pages 35 to 45)

**UNIT IV**

Writing - I

Punctuation and Kinds of Sentences (Pages 46 to 55)

**UNIT V**

Writing - II

Filling in Forms & Wrap-up (Pages 60 to 78)

**TEXTBOOK:**

Board of Editors. *Content and Language Integrated Learning to Enhance Communication Skills. Semester I Module 1.* Chennai: Tamil Nadu State Council for Higher Education, 2017.

I SEMESTER			
DSC 1	THERMAL PHYSICS		18UCPH11
Hrs/Week: 4	Hrs/Sem: 4x15= 60	Hrs./ UNIT: 12	Credit: 4

**Objectives:**

- To have a knowledge of principles of thermal physics.
- To learn the modes of transmission of heat.
- To understand the laws of thermodynamics and their applications

**UNIT I: Kinetic theory of gases**

Mean free path – Expression for mean free path – Brownian motion – Degrees of freedom and the ratio of specific heat capacities of mono, di and tri atomic gases – Transport phenomena: viscosity, thermal conduction and diffusion – Real gases – Andrews' experiment on carbon di oxide – Critical constants of a gas.

**UNIT II: Thermodynamics -I**

Zeroth law of thermodynamics – Heat – Work- Internal energy – First law of thermodynamics – Specific heat – Reversible and irreversible process- Heat engines- Carnot's engine and refrigerator-Second law of Thermodynamics- Carnot's theorem.

**UNIT III: Thermodynamics -II**

Entropy- Change in entropy in reversible process-T-S diagram- Change in entropy of a perfect gas- Change in entropy when ice is converted into steam- Physical significance of entropy- Third law of thermodynamics- Maxwell's thermodynamic relations- Clausius Clapeyron's latent heat equation.

**UNIT IV: Transmission of heat**

Types – Thermal conductivity – Lee's experiment – Convection-Applications of convection-Properties of thermal radiation – black body – absorptive and emissive power radiation in a uniform enclosure – laws of radiation – Kirchoff's law – Pressure of radiation – Stefan – Boltzmann law – Distribution of energy in black body spectrum — Planck's law(No derivation) – deduction of Wein's displacement law & Rayleigh – Jean's law from Planck's law.

**UNIT V: Common thermodynamic applications**

Practical applications of conduction of heat –Davy's safety lamp – applications of convection – Thermopile – Steam power plants – examples of cooling by evaporation- domestic refrigerator –ammonia ice plant – Air conditioning systems (summer and winter type)

**Books for Study:**

1. Heat and Thermodynamics- Brijlal, Subramanyam and Hemne, S. Chand & Co. Ltd., New Delhi, India (Revised edition 2010).
2. Thermal Physics -A.B. Gupta and H.D. Roy, Books and Allied (P) Ltd, Kolkata, India (Revised edition 2010).

**Books for Reference:**

1. College Physics – Volume I & III, N. Sundararajan, George Thomas and Syed Azeez, United Publishers, Mangalore, India (2011).
2. Thermal Physics, R.Murugesan and Kiruthiga Sivaprasath, S. Chand & Co. Ltd., New Delhi, (2008).



I SEMESTER			
DSC 2	BASIC PHYSICS		18UCPH12
Hrs/Week: 4	Hrs/Sem: 4x15= 60	Hrs./ UNIT: 12	Credit: 4

**Objectives:**

- To have a better understanding of day to day scientific events with the knowledge of elasticity, geometrical optics, sound and acoustics.
- To gain the knowledge of basics of electronics.

**UNIT I: Elasticity**

Stress and strain – Hooke's law – factors affecting elasticity – different moduli – Poisson's ratio – resilience – bending of beam – bending moment – cantilever – E by cantilever depression – non uniform bending (Scale & Telescope) – uniform bending (Pin & Microscope) – torsion of a cylinder – rigidity modulus of a wire.

**UNIT II: Geometrical Optics**

Lens – lens equation – lens maker's equation – Newton's lens equation – magnification power – Aberration – spherical aberration – reducing spherical aberration – coma – aplanatic points – astigmatism – chromatic aberration – achromatic lenses.

**UNIT III: Sound**

Stationary waves – properties – interference – Conditions for interference of sound waves – Laws of transverse vibration of a string (statements only) – Melde's experiment – Musical sound and noise – characteristics of Musical sound – intensity of sound – Measurement of intensity of sound – Decibel, bel & phon – Limits of audibility.

**UNIT IV: Acoustics**

Reverberation – Sabine's reverberation formula (No derivation) – absorption coefficient – factors affecting the acoustics of building – sound distribution in an auditorium – requisites for good acoustics – Ultrasonics – production, detection and applications.

**UNIT V: Electronics**

Semiconductors – N type and P type semiconductors – PN junction diode – characteristics under FB and RB – FW Bridge Rectifier – Zener diode – Zener regulated power supply – Bipolar transistors – characteristics under CE mode – transistor constants.

**Books for Study:**

1. College Physics – Volume I & III, N. Sundararajan & others, United Publishers, Kodialbail, Mangalore – 575003.
2. A Textbook of Sound- Brijlal and Subrahmanyam, Vikas Publishing Pvt. Ltd, New Delhi (2<sup>nd</sup> edition, 2008).
3. Principles of Electronics – V.K.Mehta and Rohit Mehta, S. Chand & Co. Ltd. New Delhi, India (Revised edition 2010).

**Books for Reference:**

1. Properties of Matter – R. Murugesan, S. Chand & Co. Ltd. New Delhi, India.
2. Textbook of optics – Brijlal & Subrahmanyam, S. Chand & Co. Ltd. New Delhi, India (Revised edition 2010)

<b>I SEMESTER</b>			
<b>AI-1</b>	<b>STATISTICS AND CALCULUS</b>		<b>18UAMA11</b>
<b>Hrs/Week: 6</b>	<b>Hrs/Sem: 6 x 15 = 90</b>	<b>Hrs./ Unit: 18</b>	<b>Credits 4</b>

**OBJECTIVES:**

1. To enable the students to understand physical science by a knowledge of elementary calculus.
2. To introduce various statistical tools to satisfy the need of concept personals.

**UNIT I:**

Measures of Central Tendency – simple average – Mean, Median & Mode – Geometrical mean and Harmonic mean.

**UNIT II:**

Measures of dispersion range-quartile deviation-standard deviation and mean deviation – coefficient of variation.

**UNIT III:**

Correlation and regression: Scatter diagram – Karl Pearson's Coefficient of Correlation – properties –Rank Correlation- lines of regression - regression coefficient and properties.

**UNIT IV:**

Pedal equations - Curvature – Radius of Curvature in Cartesian, parametric & polar co-ordinates – Evolute -Circle and centre of curvature.

**UNIT V:**

Beta and Gamma functions

**TEXTBOOKS:**

1. Statistics by S. Arumugam and Isaac, New Gamma Publications
2. Calculus by S. Arumugam and Isaac, New Gamma Publications

Unit I: TB 1: Chapter II Section 2.1 - 2.4

Unit II: TB 1: Chapter III Section 3.1

Unit III: TB 1: Chapter VI Section 6.1 – 6.3

Unit IV: TB 2: Part I Chapter III Section 3.3 – 3.5

Unit V: TB 2: Part II Chapter IV

**REFERENCE BOOKS:**

1. 1. Probability and Statistics by Joseph A. Mangaladoss Presi—Persi Publication
2. Calculus Volume I&II by S. Narayanan & T.K. Manicavachagam Pillay, S. Viswanathan publishers.

<b>I SEMESTER</b>		
<b>CP 1</b>	<b>Physics Practicals-I</b>	<b>18UCPH1P1</b>
<b>Hrs/Week: 2</b>	<b>Hrs/Sem: 30</b>	<b>Credit: 1</b>

1. Measurements of length (or diameter) using Vernier caliper, screw gauge and travelling microscope.
2. To determine the Young's Modulus of the material of the bar by Uniform bending method (Pin and Microscope).
3. To determine the Young's Modulus of the material of the bar by Non-Uniform bending method (Scale and telescope).
4. To determine acceleration due to gravity (g) by Compound Pendulum.
5. To determine the Coefficient of Viscosity of water by Capillary Flow Method (Poiseuille's method).
6. To determine the AC frequency - Sonometer
7. To determine the Refractive index and Dispersive power of the material of a given prism using sodium light- spectrometer.
8. To determine the thickness of a wire - Air wedge
9. To determine the specific heat capacity of a liquid.
10. To study the characteristics of a Zener diode.

**Books for Reference:**

1. Practical Physics, C.C. Ouseph, U.J. Rao, V. Vijayendran, S. Viswanathan (Printers & Publishers) Pvt. Ltd., (1<sup>st</sup> ed., 2007).
2. Practical Physics, P. R. Sasi Kumar, PHI.
3. Advanced Practical Physics, S. P. Singh, Pragathi Prakasam.
4. Practical Physics – St. Joseph College, Trichy.
5. A Textbook of Practical Physics, Indu Prakash and Ram Krishna, Kitab Mahal (1999).

<b>I SEMESTER</b>			
<b>EVS</b>	<b>ENVIRONMENTAL STUDIES</b>		<b>18UENS11</b>
<b>Hrs/ Week: 2</b>	<b>Hrs/ Sem: 30</b>	<b>Hrs/ UNIT: 6</b>	<b>Credits:2</b>

### **UNIT - I: Nature of Environmental Studies**

Goals, Objectives and guiding principles of environmental studies. Towards sustainable development - Environmental segments- Atmosphere, Hydrosphere, Lithosphere, Biosphere – definition. Pollution episodes – Hiroshima – Nagasaki, - Bhopal gas Tragedy, Fukushima. Stone leprosy in Taj Mahal

### **UNIT - II: Natural Resources**

Renewable and Non-Renewable resources - classification.

- Forest resources: Use and over - exploitation, Afforestation and deforestation.
- Water resources: Use and over - utilization and conservation of surface and ground water - Rainwater harvesting.
- Marine Resources: Fisheries and Coral reefs.
- Mineral resources: Use and exploitation - environmental impacts of extracting and using mineral resources.
- Food resources: Effects of modern agriculture fertilizers - pesticide problem.
- Energy resources: Growing energy needs - use of alternate energy source - Solar cells & windmills.
- Land resources: Land degradation

### **UNIT - III: Ecosystem**

- Concept of Eco-systems - Tropic level, food chains, food web and Ecological pyramids, Living conditions on other planets (Brief account).

Types, structure & Functions of the following:

- a) Aquatic ecosystem
- b) Grassland ecosystem
- c) Forest ecosystem
- d) Desert ecosystem

### **UNIT - IV: Biodiversity & Its Conservation**

Introduction - Definition: ecosystem diversity, species diversity and Genetic diversity. Hot spots of biodiversity - Western Ghats, Eastern Himalayas and Gulf of Mannar. Threats to biodiversity - Habitat Loss, Poaching of wildlife and Man - wildlife conflicts.

Conservation of biodiversity: In-situ and Ex-situ.

## **UNIT - V: Environmental Pollution**

Sources, effects, prevention and control measures of the following.

- a) Air pollution: Composition of clean air, Global warming, Ozone layer depletion.
- b) Water Pollution: Fresh water and Marine water.
- c) Noise Pollution
- d) Soil pollution

Biodegradable and Non Bio degradable wastes; Environmental Acts

- Air (prevention & Control of Pollution) Act.
- Environmental Protection Act
- Water (Prevention & Control of pollution) Act
- Environmental movements - Green peace and Chipco movement.
- Role of Central & State pollution Control Boards.

### **Books for Reference:**

1. Basic of Environmental Science. Vijayalakhmi, Murugesan and Sukumaran - Manonmaniam Sundaranar University publications.
2. Environmental Studies. John de Brito, Victor, Narayanan and Patric Raja - published by St. Xavier's College, Palayamkottai, 2008.
3. Environmental Science and Biotechnology. A.G. Murugesan and C. Raja Kumar - MJP Publishers.
4. Fundamental of Environmental pollution - Krishnan Kannan - Chand & Company Ltd., New Delhi, 1997.
5. Environmental Studies, S. Muthiah, Ramalakshmi publications, Tirunelveli.
6. Environmental Studies, V.M. Selvaraj, Bavani Publications, Tirunelveli.

இரண்டாம் பருவம்			
PART - 1 TAMIL			
TA 2	சமயத்தமிழ்		18ULTA21
Hrs/Week: 6	Hrs/Sem: 90	Hrs/Unit: 18	Credits:4

**நோக்கம்**

1. பலசமயக் கருத்துக்களை ஒப்பிட்டுச் சமயநல்லிணக்கத்தோடு வாழ்வழிகாட்டுதல்
2. தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையத் தேர்வுக்கு மாணவர்களை ஆயத்தப்படுத்துதல்.

**அலகு – 1 தமிழ்ச் செய்யுள் (துறை வெளியீடு)**

**சைவம்**

1. அ. திருநாவுக்கரசர்
  - மாசில் வீணையும்...
  - நாமார்க்கும் குடியல்லோம்...
  - அப்பன் நீ அம்மை நீ
- ஆ. திருஞானசம்பந்தர்
  - தோடுடைய செவியன்...
  - வேயுறு தோளிபங்கள்
  - மருந்தவை மந்திரம்...
- இ. சுந்தரமூர்த்தி நாயனார்
  - பித்தா பிறைகுடி...
2. திருவாசகம் & மாணிக்கவாசகர்
  - பால் நினைந்தாட்டும்....
3. திருவெம்பாவை
  - ஆதியும் அந்தமும் இல்லா...
4. திருமந்திரம் & திருமூலர்
  - ஒன்றே குலமும் ஒருவனே தேவனும்

**வைணவம்**

5. அ. பொய்கையாழ்வார்
  - வையம் தகளியா...
- ஆ. பூதத்தாழ்வார்
  - அன்பேதகளியா...
- இ. பேயாழ்வார்
  - திருக்கண்டேன்..
6. திருப்பாவை & ஆண்டாள்
  - மார்கழித் திங்கள்...

**சமணம்**

7. வளையாபூயீ
  - மக்கட் செல்வம்

**பௌத்தம்**

8. புத்தபிரான்
  - மு.ரா.பெருமாள்

**கிறித்தவம்**

9. இயேசு காவியம் (மலைப் பொழிவு)
  - கண்ணதாசன்

**இஸ்லாம்**

10. அல்லாஹ்
  - உமறுப்புலவர்
11. நபிகள்நாயக மான்மிய மஞ்சரி
  - சதாவதானிசங்குத்தம்பிபாவலர்
- (குறிப்பிட்ட பாடல்கள்)
12. குணங்குடி மஸ்தான் பாடல்கள்
  - பாசக்கயிற்றுவலை
13. ஞானப்புகழ்ச்சி
  - தக்கலை பீர்முகம்மது அப்பா
14. அலகிலா அருளும்
  - இறையருட் கவிமணி கா. அப்துல்கபூர்

**நீதிஇலக்கியம்**

15. திருக்குறள்
  - ஒழுக்கமுடைமை
13. நாலடியார்
  - கல்விகரையில்

**அலகு - 2 புதினம்**

- வாடிவாசல் - சி.சு. செல்லப்பா,  
காலச்சுவடு பதிப்பகம், நாகர்கோவில்

**அலகு - 3 உரைநடை (தமிழ்த்துறை வெளியீடு)**

போட்டித் தேர்வுகளுக்குக் கட்டுரை எழுதும் பயிற்சி

1. தமிழ் இலக்கியத்தில் சமயநல்லிணக்கச் சிந்தனைகள்
2. நபிகள்நாயகம் (ஸல்) அன்பின் தாயகம்
3. சதக்கத்துல்லாஹ் அப்பா அவர்களின் வாழ்வும் பணியும்
4. தமிழ் இலக்கியங்களில் மனிதநேயச் சிந்தனைகள்
5. தமிழ் இலக்கியத்தில் மதுஒழிப்புச் சிந்தனைகள்
6. சூஃபியச் சித்தாந்தமும் சித்தர்களும்

**அலகு - 4 (போட்டித் தேர்வுத் தயாரிப்பு) இலக்கியவரலாறு**

1. சைவம், வைணவம், கிறித்தவம், இசுலாம் வளர்த்த தமிழ்
2. புகழ் பெற்றதமிழ் நூல்கள், நூலாசிரியர்கள்

**அலகு - 5 தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையம் நடத்தும் போட்டித்**

**தேர்வுக்குரிய பொதுத் தமிழ் இலக்கணப்பகுதி - ஓர் அறிமுகம்**

1. வேர்ச் சொல்லைக் கண்டறிதல்
2. பெயரெச்சம், வினையெச்சம், முற்றெச்சம் பற்றி அறிதல்
3. வினைத்தொகை, பண்புத்தொகை பற்றி அறிதல்
4. வினைமுற்று, வினையாலணையும் பெயர் கண்டறிதல்
5. இரட்டைக்கிளவி, அடுக்குத் தொடர் அறிதல்
6. வேற்றுமைத் தொகையைக் கண்டறிதல்

**பாடநூல்**

நற்றமிழ், சதக்கத்துல்லாஹ் அப்பா கல்லூரித் தமிழ்த்துறை வெளியீடு

**வழிகாட்டு இணையதளங்கள்**

1. [www.noolulagam.com](http://www.noolulagam.com)
2. [www.tamilauthors.com](http://www.tamilauthors.com)
3. [www.tnpsc.gov.in](http://www.tnpsc.gov.in)
4. [www.tnpscexams.in](http://www.tnpscexams.in)
5. [www.tamilvu.org](http://www.tamilvu.org)

SEMESTER - II			
<b>AR 2</b>	<b>APPLIED GRAMMAR AND TRANSLATION-II</b>		<b>18ULAR21</b>
<b>Hrs/ Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/ Unit: 18</b>	<b>Credits: 4</b>

**Objectives:** To make the students to develop the skill of basic Arabic Grammar and Translation skills from Arabic to English vice-versa.

**Unit I: Lessons 1 to 3 (Textbook – 1)**

من الدرس الأول إلى الدرس الثالث

**Unit II: Lessons 4 to 6 (Textbook – 1)**

من الدرس الرابع إلى الدرس السادس

**Unit III: Grammar Portions (Textbook – 2)**

- 1) Inna and Its sisters (إن وأخواتها)
- 2) Elative (اسم التفضيل)
- 3) Perfect Tense (الفعل الماضي)
- 4) Imperfect Tense (الفعل المضارع)
- 5) Doer and Object (الفاعل والمفعول)
- 6) Kaana and its sisters (كان وأخواتها)
- 7) Classification of Verb into Sound and weak verb (تقسيم الفعل إلى صحيح ومعتل)
- 8) Transitive and Intransitive verb (الفعل اللازم والمتعدي)
- 9) Verbal Noun (المصدر)

**Unit IV: Lessons 7 to 9 (Textbook – 1)**

من الدرس السابع إلى الدرس التاسع

**Unit V: Lessons 10 to 12 (Textbook – 1)**

من الدرس العاشر إلى الدرس الثاني عشر

**TEXTBOOKS**

- 1) Duroosul Lughatil Arabiya Part – II Lessons 1 to 12 only by Dr. V. Abdur Rahim. Available at: Islamic foundation Trust, 78 Perambur High Road, Perambur, Chennai- 600 012.
- 2) Arabic Tutor Part - I, II & III, By: Moulana Ebrahim Muhammad Karachi- DarulIshaat.



II SEMESTER			
EN 2	PART II ENGLISH Prose, Poetry and Grammar - II		18ULEN21
Hrs/ Week: 6	Hrs/ Sem: 90	Hrs/ Unit: 18	Credits: 4

**Objectives:**

- To answer comprehensive questions on a passage of moderate level of difficulty.
- To write a critical appreciation of the prescribed poems and write sentences in English grammatically.

**UNIT I PROSE**

- |              |                    |
|--------------|--------------------|
| 1. Appro JRD | - Sudha Murthy     |
| 2. Packing   | - Jerome K. Jerome |

**UNIT II PROSE**

- |                                  |                   |
|----------------------------------|-------------------|
| 3. How I Became a Public Speaker | - G. B. Shaw      |
| 4. Values in Life                | - Rudyard Kipling |

**UNIT III POETRY**

- |                        |                  |
|------------------------|------------------|
| 1. Money-Madness       | - D. H. Lawrence |
| 2. No Men are Foreign  | - James Kirkup   |
| 3. On Another's Sorrow | - William Blake  |

**UNIT IV GRAMMAR**

1. Subject-Verb Agreement
2. Verbs: Forms of 'to be', 'have', 'do'; modal auxiliaries

**UNIT V COMMUNICATION SKILLS**

1. Story Building
2. e-Communication: Fax; e-mail
3. Notices, Agendas and Minutes

**TEXTBOOK:**

Kulat L Ambadas, Dr. Joshi, Sandeep. et. al. (ed). *Blooming Buds*. Hyderabad: Orient BlackSwan, 2017.

II SEMESTER			
<b>DSC 3</b>	<b>PHYSICAL OPTICS AND SPECTROSCOPY</b>		<b>18UCPH21</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4x15= 60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit: 4</b>

**Objectives:**

- To understand the concepts of physical optics like interference, diffraction and polarization and its applications
- To learn the basic principles of spectroscopy and its applications in various fields.

**UNIT I Interference**

Conditions for interference – interference due to reflected light – Newton's rings – theory and experiment to find R and refractive index of liquid – Air wedge – theory and experiment to find the diameter of a thin wire – testing the planeness of the surface – Michelson's interferometer – determination of wavelength and thickness of a mica sheet.

**UNIT II Diffraction**

Fresnel and Fraunhofer classes of diffraction – Fresnel's diffraction at a straight edge – theory of diffraction grating – determination of wave length – absent spectra –overlapping spectra – Dispersive and resolving powers of a grating – comparison between prism and grating spectrum.

**UNIT III Polarisation**

Double refraction – Huygen's explanation – Nicol prism – quarter wave plate and half wave plate – plane, partially, elliptically, and circularly polarized light – their production and detection – optical activity – Fresnel's explanation – bi quartz polarimeter – determination of specific rotatory power.

**UNIT IV Microwave Spectroscopy**

Microwave spectroscopy – theory – pure rotational Spectra of diatomic molecules – rigid rotator – symmetric and asymmetric top molecule –Block diagram of microwave spectrometer – microwave oven.

**UNIT V IR and Raman spectroscopy**

Preliminaries – selection rules – vibrating diatomic molecule – diatomic vibrating rotator – vibration of poly atomic molecules – normal vibration of CO<sub>2</sub> and H<sub>2</sub>O molecules – Biological and other application of IR – theory of Raman scattering – application of Raman spectrum.

**Books for Study:**

1. Optics and Spectroscopy – Murugesan and Kiruthiga Sivaprasath, S. Chand & Co., New Delhi, India (7<sup>th</sup> edition, 2010).
2. A Textbook of OPTICS - N. Subramanyam, Brijlal and M.N. Avadhanulu, S. Chand & Co., New Delhi, India (2012).
3. Fundamentals of Molecular Spectroscopy – C.N. Banwell, Tata McGraw Hill Company Ltd., New Delhi (5<sup>th</sup> ed.).

**Books for Reference:**

1. Fundamental of Optics – F.A. Jenkins. and H.E. White, McGraw Hill Inc., New Delhi, (2011).
2. Spectroscopy (Atomic and Molecular), Gurdeep R. Chatwal, Himalaya Publishing House.

II SEMESTER			
<b>DSC 4</b>	<b>MECHANICS AND ASTROPHYSICS</b>		<b>18UCPH22</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4x15= 60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit: 4</b>

**Objectives:**

- To understand the concepts of friction, collision and projectiles.
- To impart the knowledge of gravitation and to learn about satellites and its applications.
- To introduce the basics of Astrophysics

**UNIT I      Frictional & Rotational motion**

Friction between solid surfaces – Coefficient of Static, Kinetic & Rolling friction – Laws of friction – angular velocity – angular acceleration – rotation with constant angular acceleration – K.E. of rotation – work & power in rotation – torque and angular acceleration – angular momentum – conservation of angular momentum.

**UNIT II      Collision**

Elastic and inelastic – Lab frame and centre of mass frame – perfectly elastic collision in one dimension – Final velocities after collision – perfectly inelastic collision in one dimension – coefficient of restitution – elastic collision in two dimensions.

**UNIT III      Gravitation**

Newton's law of gravitation– gravitational field – gravitational potential – gravitational potential energy – gravitational potential and field due to thin spherical shell, hollow sphere, solid sphere – inertial mass and gravitational mass – Projectiles (Definition of Range, time of flight maximum range and angle of projection)- escape velocity.

**UNIT IV      Satellites**

Satellite motion – orbital velocity – time period – launching of artificial satellites – binding energy of a satellite – geostationary satellite – weightlessness – artificial gravity in space stations – remote sensing through satellites – Indian remote sensing satellites – applications of remote sensing.

**UNIT V      Astrophysics**

Physical properties of stars – luminosity, brightness, distance, surface temperature, mass, chemical composition, internal temperature, internal pressure, mass – luminosity relation – stellar evolution – formation of stars – white dwarf (brief account only) – black holes – supernova explosion.

**Books for study:**

1. College Physics – Volume I & III – N. Sundararajan, George Thomas and Syed Aziz – United Publishers, Mangalore, India.
2. College Physics – Volume I – A.B. Gupta – Books and allied (P) Ltd, Kolkata, India.

**Books for reference:**

1. Properties of Matter – Brijlal and Subrahmanyam – S. Chand & Co. Ltd. New Delhi.
2. Mechanics & Electrodynamics – Brijlal and Subrahmanyam, S. Chand & Co. Ltd. New Delhi.

II SEMESTER			
<b>AI 2</b>	<b>ALGEBRA &amp; DIFFERENTIAL EQUATIONS</b>		<b>18UAMA21</b>
<b>Hrs/Week: 6</b>	<b>Hrs/Sem: 6 x 15 = 90</b>	<b>Hrs/ Unit: 18</b>	<b>Credits: 4</b>

**OBJECTIVE:**

- To enable the students to understand physical science by a knowledge of algebra and differential equations.

**UNIT I:** Theorems on theory of Equation – Relation between roots and coefficients – Symmetric functions of roots in terms of coefficients.

**UNIT II:** Transformation of Equations – Reciprocal Equations.

**UNIT III:** Approximate solutions of numerical equations using Newton's method and Horner's method.

**UNIT IV:** First order higher degree Differential equations - Solvable for p, x and y- Clairaut's form

**UNIT V:** Linear differential equation with constant coefficients- particular integrals of the form  $f(x) e^{ax}$ ,  $x^n$ .

**TEXTBOOK:**

- Classical Algebra by Joseph A. Mangaladoss, S. Firthous Fatima, M. Himaya Jaleela Begum and Dr. Syed Ali Fathima, Presi – Persi Publications – Edition 2016.
- Differential Equations & Applications by S. Arumugam and Issac, New Gamma Publications—Edition 2008.

Unit I : **TB 1** Chapter I: Section 1.1, 1.2 & Chapter II: Section 2.1.

Unit II : **TB 1** Chapter II: Section 2.2 & Chapter IV: Section 4.1-4.4

Unit III : **TB 1** Chapter V: Section 5.1, 5.2

Unit IV : **TB 2** Chapter I: Section 1.7

Unit V : **TB2** Chapter II: Section 2.3

**Books for Reference:**

- Algebra by Arumugam and Issac, New Gamma Publications – Edition 2011.
- Differential Equation & Vector Calculas by Joseph A. Mangaldoss, Presi – Persi Publications.

<b>II SEMESTER</b>		
<b>CP 2</b>	<b>Physics Practicals-II</b>	<b>18UCPH2P1</b>
<b>Hrs/Week: 2</b>	<b>Hrs/Sem: 2x15= 30</b>	<b>Credit: 1</b>

1. To determine the Young's Modulus of the material of the bar by Cantilever
2. To determine the Rigidity Modulus of a Wire by Torsional pendulum.
3. To verify the perpendicular axes theorem by Bifilar pendulum.
4. To determine the coefficient of viscosity by Stokes method.
5. To determine the surface tension of a liquid
6. To determine the frequency of a tuning fork – Melde's string
7. To determine wavelength of sodium light using Newton's Rings.
8. To determine the wavelength of spectral lines of mercury spectrum-Grating normal incidence method-spectrometer.
9. To determine the coefficient of thermal conductivity of a bad conductor- Lee's Disc method
10. To study the characteristics of a transistor.

#### **Books for Reference:**

1. Practical Physics, C.C. Ouseph, U.J. Rao, V. Vijayendran, S. Viswanathan (Printers & Publishers) Pvt. Ltd., (1<sup>st</sup> ed., 2007).
2. Practical Physics, P. R. Sasi Kumar, PHI.
3. Advanced Practical Physics, S. P. Singh, Pragathi Prakasam.
4. Practical Physics – St. Joseph College, Trichy.
5. A Textbook of Practical Physics, Indu Prakash and Ram Krishna, Kitab Mahal (1999).

II SEMESTER			
VE 1	VALUE EDUCATION – I		18USVE2A
Hrs/ Week: 2	Hrs/ Sem: 30	Hrs/ Unit: 6	Credits:2

**Objectives:**

- To inculcate moral values in the minds of students.
- To teach ethical practices to be adopted by students in their life.
- To make students honest and upright in their life.

**UNIT I**

Islam – Meaning – Importance – A complete Religion – The religion accepted by God – Five Pillars of Islam – Kalima – Prayers – Fasting – Zakat – Haj.

Iman – Monotheism – Angels – Books – Prophets – Dooms Day – Life after death – Heaven and Hell.

**UNIT II**

Quran – The Book of Allah – Wahi – Revelation to Prophet Muhammad(sal) – Compilation – Preservance – Structure – Content – Purpose – Source of Islamic Law– Sura Fathiha, Kafirun, Iqlas, Falakh and Nas.

**UNIT III**

Hadith – Siha Sitha – Buhari – Muslim – Tirmithi – Abu Dawood – Nasai – Ibn Maja – Collection of Hadith – Meaning of 40 Hadith.

**UNIT IV**

Life History of Prophet Muhammad (sal) – Aiamul Jahiliya – Prophet's Childhood and Marriage – Prophethood – Life at Mecca – Life at Medinah – Farewell Address – Seal of Prophethood.

**UNIT V**

Good character – Etiquettes – Halal and Haram – Duties towards Allah – Duties towards fellow beings – Masnoon Duas.

**REFERENCE BOOKS:**

1. V.A. Moahmed Ashrof – Islamic Dimensions – Reflection and Review on Quranic Themes.
2. The Presidency of Islamic Researchers – Revised & Edited – The Holy Quran.
3. M. Manzoor Nomani – Islamic Faith & Practice.
4. Abdul Hasan Ali Nadvi – Muhammad Rasulullah.
5. K. Ali – A Study of Islamic History.
6. Abdul Rahuman Abdullah – Islamic Dress code for Women.
7. Dr. Munir Ahamed Mughal – Code for Believers.
8. Abdul Malik Mujahid – Gems and Jewels.

II SEMESTER			
VE 2	VALUE EDUCATION – II		18USVE2B
Hrs/ Week: 2	Hrs/ Sem: 30	Hrs/ Unit: 6	Credits: 2

### UNIT I

Individual Morality – Objective of Moral life – Living in accordance with the code of Morality – the goodness of Morality – Morality and *Thirukural*- The need for faith.

### UNIT II

Adherence to higher code of Morality – Fear of God – Good Moral Values – Duty to Parents – Teacher, respecting elders – Moral Etiquettes – Right-minded Principle – High Principles for Proper conduct.

### UNIT III

Inculcating good attitudes – Open mindedness – Morale – analysing the pros and cons of good and bad – Service to others – Mind Power, tolerance, respecting others, showing love to others, patience – tranquility – Modesty, kindness and forgiveness.

### UNIT IV

Quotations and moral Stories expressing Good characters of Great personalities – Life History of Great people: Mahatma Gandhi, Abraham Lincoln, Dr. A.P.J. Abdul Kalam.

### UNIT V

Truth, the importance of uprightness, integrity, friendship – Health awareness on Alcohol and drug abuse – inculcating reading habit – reading good books – Hygiene – Dowry – Corruption.

### TEXTBOOK:

Publication of Sadakathullah Appa College.

மூன்றாம் பருவம் PART - 1 TAMIL			
<b>TA 3</b>	பயன்பாட்டுத் தமிழ்		<b>18ULTA31</b>
<b>Hrs/Week: 6</b>	<b>Hrs/Sem: 90</b>	<b>Hrs/Unit: 18</b>	<b>Credits:4</b>

**நோக்கம்**

1. தமிழின் காப்பியஇலக்கிய வளத்தை மாணவர்களுக்கு உணர்த்துதல்.
2. இந்திய ஆட்சிப் பணித்தேர்வுக்கு மாணவர்களை ஆயத்தப்படுத்துதல்.
3. செய்தி வெளிப்பாட்டு உத்திகளைத் கற்றுத் தந்து மாணவர்களை ஊடகவியலாளர்களாக உருவாக்க முயலுதல்

**அலகு – 1: தமிழ்ச் செய்யுள்திரட்டு (துறை வெளியீடு)**

1. சிலப்பதிகாரம் - காட்சிக்காதை
2. மணிமேகலை - ஆபுத்திரன் திறம் அறிவித்த காதை
3. பெரியபுராணம் - கண்ணப்பநாயனார் புராணம்
4. கம்பராமாயணம் - வாலிவதைப்படலம்
5. இரட்சண்ய யாத்திரிகம் - தீயமகன் திருந்திய கதை
6. சீறாப்புராணம் - மானுக்குப் பிணைநின்றபடலம்

**அலகு – 2:**

“ஐ.ஏ.எஸ். தேர்வும் அணுகுமுறையும்” வெ.இறையன்பு இ.ஆ.ப, நியூ செஞ்சரி புக் ஹவுஸ், அம்பத்தூர், சென்னை-8

**அலகு – 3: ஊடகப்படைப்பாக்கம்**

- வானொலிக்கு உரைச்சித்திரம் தொலைக்காட்சி நிகழ்ச்சித் தயாரிப்புக்கு எழுதுதல்
- தொலைக்காட்சிச் செய்தியறிக்கை தயாரித்தல்.
- தமிழ் நாளிதழ்களுக்குச் சிறப்புக் கட்டுரைகள், வாசகர் கடிதங்கள் எழுதுதல் - இலக்கியப்படைப்பாளருடன் நேர்காணல் தொலைக்காட்சி விவாதம்
- நேர்முக வருணனை
- சமூகஊடகங்களின் தாக்கம்

**அலகு – 4: தமிழ் இலக்கியவரலாறு**

- ஐம்பெரும் காப்பியங்கள்
- ஐஞ்சிறு காப்பியங்கள்
- சிற்றிலக்கியங்கள் (உலா, தூது, பிள்ளைத்தமிழ், பரணி)

**அலகு – 5: இலக்கணம்**

(தமிழ்நாடு அரசுப் பணியாளர் தேர்வாணையத்தின் பொதுத்தமிழ் இலக்கணப்பகுதி)

- பிழைத் திருத்தம், சந்திப்பிழைகள், ஒருமை-பன்மை பிழைகள், மரபுப் பிழைகள்
- வழுவச் சொற்களை நீக்குதல், பிறமொழிச் சொற்களை நீக்குதல், வேர்சொல்லைச் தேர்வு செய்தல்.

**பாடநூல்**

இருந்தமிழ், சதக்கத்துல்லாஹ் அப்பா கல்லூரித் தமிழ்த்துறை வெளியீடு

**பார்வை நூல்கள்**

- |                                      |  |
|--------------------------------------|--|
| தமிழ் இலக்கியவரலாறு                  | - க.பஞ்சாங்கம், அன்னம் அகரம் வெளியீடு, கும்பகோணம். |
| இதழியல் நுணுக்கங்கள்                 | - செண்பகா பதிப்பகம், சென்னை-17                     |
| வானொலிநிகழ்ச்சிக் கலை                | - சிந்துமலர் வெளியீடு, சென்னை                      |
| சீறாப்புராணம் மூலமும் பொழிப்புரையும் | - ஹாஜி எம். முகமது யூசுப், இரண்டாம் பாகம்          |
| மக்கள்ஊடகத் தொடர்பியல்               | - மீடியா பப்ளிகேஷன்ஸ், மதுரை                       |
| தொலைக்காட்சி நிகழ்ச்சிக் கலை         | - வள்ளுவன் வெளியீட்டகம், சென்னை.                   |



SEMESTER III			
AR 3	Applied Grammar and Translation-III		18ULAR31
Hrs/ Week: 6	Hrs/Sem: 90	Hrs/ Unit: 18	Credits: 4

**Objectives:** To enable the students to understand simple Arabic sentences and construct Arabic sentences simple by their own

**Unit I: Lessons 13 to 16 (Textbook – 1)**

من الدرس الثالث عشر إلى الدرس السادس عشر

**Unit II: Lessons 17 to 19 (Textbook – 1)**

من الدرس السابع عشر إلى الدرس التاسع عشر

**Unit III: Grammar Portions (Textbook – 2)**

- 1) Imperative and Prohibition (الأمر والنهي)
- 2) Original letters which are not enhanced (الفعل المجرد)
3. Original letters which are enhanced (مزيد فيه)
- 4) Subjunctive mood (الحروف الناصبة)
- 5) Jussive Mood (الحروف الجازمة)
- 6) Negative particles (ما و لا وما ولا النافيتان)
- 7) Number 1 to 10,000 (العدد من الواحد إلى عشرة آلاف)

**Unit IV: Lessons 20 to 22 (Textbook – 1)**

من الدرس العشرون إلى الدرس الثاني والعشرون

**Unit V: Lessons 23 to 25 (Textbook – 1)**

من الدرس الثالث والعشرون إلى الدرس الخامس والعشرون

### TEXTBOOKS

- 1) Duroosul Lughatil Arabiya Part – II Lessons 13 to 25 only by Dr. V. Abdur Rahim. Available at: Islamic foundation Trust, 78 Perambur High Road, Perambur, Chennai - 600 012.
- 2) Arabic Tutor Part - I, II & III, By: Moulana Ebrahim Muhammad Karachi - Darul Ishaat,

III SEMESTER			
Part - II - English			
<b>EN 3</b>	<b>ONE-ACT PLAYS AND WRITING SKILL</b>		<b>18ULEN31</b>
<b>Hrs/ Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/ Unit: 18</b>	<b>Credits: 4</b>

**Objectives:**

1. To expose the conversational patterns to students and enable them to make use of the patterns in a given practical situation.
2. To write sentences in English grammatically.

**UNIT I – ONE-ACT PLAYS**

- |                              |   |                  |
|------------------------------|---|------------------|
| 1. The Bishop's Candlesticks | - | Norman McKinnell |
| 2. The Proposal              | - | Anton Chekov     |
| 3. The Hour of Truth         | - | Percival Wilde   |

**UNIT II – ONE-ACT PLAYS**

- |                                 |   |                   |
|---------------------------------|---|-------------------|
| 4. Aladdin and His Magic Lamp   | - | Y. Sayed Mohammed |
| 5. Tippu Sultan                 | - | Y. Sayed Mohammed |
| 6. Evergreen Merchant of Venice | - | Y. Sayed Mohammed |

**UNIT III – WRITING SKILL**

1. **Messages** (Pages 1-9 of Written English for You to be taught and the tasks given to be accomplished in the Record of Writing)
  - i) What is a message?
  - ii) When do we write messages?
  - iii) Why do we write messages?
  - iv) How do we write messages?
2. **Letters – 1** (Pages 10-20 Written English for You to be taught and the tasks given in pages 17 and 19 should be accomplished in the Record of Writing)
  - i) Letters for Ordering Supply of Goods
  - ii) Letters of Complaint
  - iii) Letters of Enquiry
3. **Letters – 2** (Pages 36-42 of Written English for You to be taught and the tasks given in the pages 38 and 44 should be accomplished in the Record of Writing)
  - i) Letters to inform your plan of visit
  - ii) Letters of Request
  - iii) Letters of Asking for Advice

**UNIT IV – WRITING SKILL**

4. **Essays** (Pages 66-79 to be taught and only the tasks 1-3 from pages 79 and 80 should be accomplished in the Record of Writing)
  - i) What is an Essay?
  - ii) Types of Essays.
  - iii) The structure of an Essay.
  - iv) Introductory paragraph.
  - v) Supporting paragraph.
  - vi) What can be the length of an Essay?
  - vii) Why am I writing this Essay?

- viii) Who am I writing for?
  - ix) How to begin an Essay?
  - x) How to organize an Essay?
  - xi) What to avoid in writing an Essay?
5. **Narrating** (Pages 109-116 of Written English for You to be taught only the tasks 1 and 2 from pages 115 to 116 to be accomplished in the Record of Writing)
- i) Describing events in a chronological order.
  - ii) Narrating events from different points of view
  - iii) Narrating events from different viewpoint in time

#### **UNIT V – WRITING SKILL**

6. **Reporting** (Pages 127-136 be taught. The tasks given in pages 129- 134 and 136-137 must be accomplished in the Record of Writing)
- i) News Reports
  - ii) Reporting events or Developments.
  - iii) Reporting Interviews and Press Conferences
  - iv) Reports of Meetings.
7. **Summarizing** (Pages 164-172 of Written English for You be taught and the tasks 1-3 in pages 172-178 to be accomplished in the Record of Writing)
- i) What is a Summary?
  - ii) How to write a Summary?
  - iii) How long should a Summary be?
  - iv) Should the Summary be in a Paragraph?
  - v) Analysis of the process of Summarizing.

**NOTE:** Questions for Units III, IV and V should be framed from the tasks given in the prescribed textbook **Written English for You**.

#### **TEXTBOOKS**

1. Compiled by a Board of Editors. Plays for Pleasure. Chennai:Paavai Publications, 2009.
2. Sayed Mohammed. Y, ed. Three One-Act Plays. Tirunelveli: Muhammed Taahaa Publications, 2011.
3. Radhakrishna Pillai. G, ed. Written English for you. Chennai: Emerald Publishers, 1990 (rpt. 2008).

III SEMESTER			
<b>DSC 5</b>	<b>Electricity, Electromagnetism and Electromagnetic theory</b>		<b>18UCPH31</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4x15= 60</b>	<b>Hrs./UNIT:12</b>	<b>Credit: 4</b>

**Objectives:**

- To deal with the basic concepts of electricity and magnetism.
- To discuss the different laws governing the behaviour of current.
- To understand the magnetic effect of current.
- To study the basics of electromagnetic waves and its propagation.

**UNIT I: Current Electricity**

Thevenin's and Norton's theorems - Wheatstone's bridge – sensitiveness of the Wheatstone's bridge – meter bridge – Carey fosters bridge – LR, RC and LCR series circuits – high resistance by leakage.

**UNIT II: Alternating Current**

Measurement of AC – AC Circuit containing L, C and R - LCR circuits (series and parallel)-theory and applications – power in an AC circuit- Kirchhoff's law in AC - Application of Kirchhoff's law- Owen's bridge- Anderson bridge – series and parallel circuits.

**UNIT III: Electrostatics**

Coulomb's law- electric field- electric potential -Electric dipole-field intensity at any point due to a dipole –Gauss's law and its proof – applications (spherical charge and plane sheet of charge distribution)- Coulomb's law from Gauss law- mechanical force experienced by a charged conductor – conservative nature of electric potential-parallel plate capacitor – effect of dielectric – partially filled dielectric capacitor.

**UNIT IV: Electromagnetic Induction**

Beer Lambert's law-Magnetic field due to a current carrying a wire- Ampere's law- Faraday's law of electromagnetic induction-vector form – self-inductance – self-inductance of a long solenoid - Rayleigh bridge – mutual inductance - mutual inductance between two co axial coil - experimental determination of mutual inductance - coefficient of coupling.

**UNIT V: Maxwell's Equations and electromagnetic Wave Propagation**

Equation of continuity, displacement current, Maxwell's equations in free space and in medium, Maxwell's wave equation- transverse nature of EM waves - pointing vector - energy density in electromagnetic field, electromagnetic wave propagation through vacuum and isotropic dielectric medium.

**Books for Study:**

1. Electricity and Magnetism – R. Murugesan, S. Chand and Company Ltd. New Delhi (9<sup>th</sup> revised ed., 2014).
2. Electricity and Magnetism- Brijlal and Subrmanian, 7<sup>th</sup> edition, S. Chand & Co, New Delhi (2016)

**Books for Reference:**

1. University Physics with Modern Physics, Hugh D. Young and Roger A. Freedman, Sears & Zemansky's, 14<sup>th</sup> Edition (2015).
2. Electricity and Magnetism – Sehgal and Chopra, - S. Chand & sons, New Delhi (5<sup>th</sup> ed.,1992).
3. Introduction to Electrodynamics – David J Griffiths, Prentice Hall of India Pvt Ltd., New Delhi (2<sup>nd</sup> ed.,1997).

III SEMESTER			
<b>DSE 1A</b>	<b>INTRODUCTION TO COMPUTERS</b>		<b>18UEPH3A</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4x15= 60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit: 4</b>

**Objectives:**

- To understand the basic concepts of a computer system and programming.
- To learn the windows XP operating system.
- To acquire the knowledge about the Internet and its applications.

**UNIT I Introduction to Computers**

Introduction – Characteristics of Computers – Evolution of Computers – Generations of Computers – classification of Computers – The Computer system – Applications of Computers

**UNIT II Peripheral devices & Computer programming**

Input devices – output devices – Primary memory – RAM, types of RAM, ROM, types of ROM & Secondary storage devices– Classification of secondary storage Introduction – developing a program – Algorithm – Flowchart – Pseudo code – program testing & debugging – Unstructured Programming – Structural Programming – Characteristics of a Good Program.

**UNIT III Operating system and Windows XP**

Operating system – types of operating system – modern operating systems- What is windows? – starting windows XP – The Desktop – start button – log off/turn off the computer – structure of window – moving a window – maximizing, minimizing and restoring a window – closing a window – standard buttons on toolbar – folder options – copying and moving files/folders – deleting files/folders – creating a new file/folder – rename a file/folder – install and uninstall programs – starting and closing program – starting a program using run.

**UNIT IV Internet**

Introduction – Evolution of internet – Basic internet terms – Getting connected to internet – Internet applications (World wide web, E-mail, Internet telephony & video conferencing) – How E-Mail works – Searching the web – Web browsers.

**UNIT IV Internet Security**

Security trends- The OSI security Architecture- Security attacks: Passive Attacks- Active Attacks- Security Services – Security Mechanism

**Books for Study and Reference:**

1. Introduction to Computer Science – ITL Education Solutions Limited – 5<sup>th</sup> Impression – Pearson Education South Asia.
2. Windows XP in easy steps – Harshad Kotecha – Revised edition – Dream Tech Press – New Delhi.
3. Network Security Essentials Application and Standards, William Stallings, Pearson Education (3<sup>rd</sup> ed.)

III SEMESTER			
DSE 1B	RADIATION SAFETY		18UEPH3B
Hrs/Week: 4	Hrs/Sem: 4x15= 60	Hrs./ UNIT: 12	Credit: 4

**Objectives:**

- To create awareness and understanding regarding radiation hazards and safety.

**UNIT I: Basics of Atomic and Nuclear Physics:**

Basic concept of atomic structure; X rays characteristic and production - concept of bremsstrahlung radiation – The composition of nucleus and its properties - mass number, isotopes of element, binding energy, stable and unstable isotopes - law of radioactive decay, Mean life and half-life - basic concept of alpha, beta and gamma decay - nuclear reactions, types of nuclear reaction, fusion, fission.

**UNIT II: Interaction of Radiation with matter:**

Types of Radiation: Alpha, Beta, Gamma and Neutron and their sources, sealed and unsealed sources -Interaction of Photons: Photoelectric effect, Compton Scattering, Pair Production -Interaction of Charged Particles: Heavy charged particles, Range, Straggling, Channeling and Cherenkov radiation. Beta Particles- Collision and Radiation loss (Bremsstrahlung) -Interaction of Neutrons: Collision, slowing down and Moderation.

**UNIT III: Radiation detection and monitoring devices:**

Radiation Quantities and Units: Basic idea of different units of activity, KERMA, exposure, absorbed dose, equivalent dose, effective dose, collective equivalent dose, Annual Limit of Intake (ALI) and derived Air Concentration (DAC). Radiation detection: Basic concept and working principle of gas detectors (Ionization Chambers, Proportional Counter, Geiger Muller Counter), Scintillation Detectors, Solid States Detectors and Neutron Detectors.

**UNIT IV: Radiation safety management:**

Biological effects of ionizing radiation, Operational limits and basics of radiation hazards evaluation and control: radiation protection standards, International Commission on Radiological Protection (ICRP) principles, justification, optimization, and limitation, introduction of safety and risk management of radiation. Nuclear waste and disposal management.

**UNIT V: Applications of nuclear techniques:**

Applications in medical science (e.g., MRI, PET, Projection Imaging Gamma Camera, radiation therapy), Archaeology, Art, Crime detection, Mining and oil. Industrial Uses: Tracing, Gauging, Material Modification, Sterilization, Food preservation.

**Books for Study:**

1. Textbook of radiological Safety – K Thayalan - Jaypee Brothers, Medical Publishers Pvt. Limited (2009).
2. Basic Radiological Physics – Second Edition – Kuppusamy Thayalan - Jaypee Brothers, Medical Publishers Pvt. Limited (2017).

**Books for Reference:**

1. W.E. Burcham and M. Jobes – Nuclear and Particle Physics – Longman (1995)
2. G.F. Knoll, Radiation detection and measurements
3. W.J. Meredith and J.B. Massey, “Fundamental Physics of Radiology”. John Wright and Sons, UK, 1989.
4. J.R. Greening, “Fundamentals of Radiation Dosimetry”, Medical Physics Handbook Series, No.6, Adam Hilger Ltd., Bristol 1981.
5. Practical Applications of Radioactivity and Nuclear Radiations, G.C. Lowental and P.L. Airey, Cambridge University Press, U.K., 2001
6. A. Martin and S.A. Harbisor, An Introduction to Radiation Protection, John Willey & Sons, Inc. New York, 1981.

<b>PART III - ALLIED II – CHEMISTRY</b> <b>(Offered by Chemistry Department to Physics Students)</b>			
<b>III SEMESTER</b>			
<b>AII 1</b>	<b>ALLIED CHEMISTRY - I</b>		<b>18UACH31</b>
<b>Hrs / Week: 4</b>	<b>Hrs / Sem: 60</b>	<b>Hrs / Unit: 12</b>	<b>Credit: 3</b>

**Objective:**

- To understand the principles of electrochemical reactions.
- To learn the Kinetics of Chemical reactions and Photochemical reactions.
- To understand the principles of chemical analysis – qualitative and quantitative.
- To learn about the solutions and their types.
- To study about lubricants and some important day today chemicals.

**UNIT I: Electrochemistry**

Electrolytic conductance - measurement of conductivity – applications of conductivity measurements.

pH- pH values of solutions – determination of pH – problems – buffer solutions – Henderson's equation – derivation and significance.

EMF – Cells - construction - measurement – application of potentiometry.

Lead storage battery - acid battery – dry cells.

**UNIT II: Chemical Kinetics and Photochemistry**

Order and molecularity – expression for rate constants for first and second order reactions (derivations) - time for half change - rate constants for third and zero order reactions (derivation not required) – methods of determination of order of reactions.

Photochemistry - thermal and Photochemical reactions - laws of photochemistry - Quantum yield - methods of determination - fluorescence, phosphorescence.

**UNIT III: Analytical Chemistry**

Introduction to qualitative and quantitative analysis - Principle of volumetric analysis - error analysis – types of errors – minimizing errors - accuracy and precession - methods of expressing precession, mean, median, mean deviation, standard deviation and confidence limit - curve fitting – method of least squares – significant figures.

**UNIT IV: Solutions**

Methods of expressing solution concentration – Molarity, molality, mole fraction, normality, mass fraction, parts per million- solutions of gases in liquid - solubility of gases in liquids - Henry's law – statement and limitations.

Solutions of liquids in liquids – Binary liquid mixtures - Theory of fractional distillation – benzene- toluene system. Azeotropic distillation - ethanol-water system

**UNIT V: Applied Chemistry**

Lubricants - classification - criteria of good lubricating oils - synthetic lubricating oils - poly glycols and poly alkene oxides - greases or semi solid lubricants - examples -

Preparation and uses of shampoo, nail polish, toothpaste, boot polish, moth ball, chalk piece.



**REFERENCE BOOKS:**

1. B. R. Puri, L. R. Sharma and K. C. Kalia, Principles of Inorganic Chemistry
2. P. L. Soni, Textbook of Inorganic Chemistry
3. K. S. Tewari and N. K. Vishnoi, A Textbook of Organic Chemistry.
4. Arun Bahl and B.S. Bahl, Advanced Organic Chemistry, S. Chand and Sons.
5. M.K. Jain and S. C. Sharma, Modern Organic Chemistry
6. K.K. Rohatgi Mukherjee, Fundamentals of photochemistry, Wiley Eastern Ltd.
7. B.R. Puri and L.R. Sharma, Principles of Physical Chemistry, S. Chand & Co.
8. Malcom P. Stevens, Polymer Chemistry - An Introduction
9. V.R. Gowariker, Polymer Science, Wiley Eastern, 1995.
10. Sawyer. W, Experimental cosmetics, Dover publishers, New York, 2000.

III SEMESTER		
<b>CP 3</b>	<b>PHYSICS PRACTICALS -III</b>	<b>18UCPH3P1</b>
<b>Hrs/Week: 2</b>	<b>Hrs/Sem: 2x15= 30</b>	<b>Credit: 1</b>

1. To calibrate the low range voltmeter- Potentiometer.
2. To calibrate the low range ammeter- Potentiometer.
3. To study a series LCR circuit and determine its (a) Resonant Frequency, (b) Quality Factor
4. To study a parallel LCR circuit and determine its (a) Anti-resonant frequency and (b) Quality factor
5. Ballistic Galvanometer - Measurement of charge and current sensitivity.
6. To determine a Specific resistance of the wire by Carey Foster's Bridge.
7. Determination of magnetic moment of a magnet- Axial Coil method.
8. Determination of  $m$  &  $B_H$  - Deflection Magnetometer - Tan C Position.
9. Determination of  $B_H$  using Axial Coil method.
10. To determine the wavelength of spectral lines of mercury spectrum- Grating oblique incidence method-spectrometer.

**Books for Reference:**

1. Ouseph, Srinivasan & Vijayendran, Practical Physics
2. P. R. Sasi Kumar, Practical Physics –, PHI.
3. S. P. Singh, Advanced Practical Physics, Pragathi Prakasam.
4. Practical Physics – St. Joseph College, Trichy.
5. A Textbook of Practical Physics, Indu Prakash and Ramakrishna, 11<sup>th</sup> ed.

III SEMESTER		
<b>AII P1</b>	<b>INORGANIC QUALITATIVE ANALYSIS</b>	<b>18UACH3P1</b>
<b>Hrs / Week: 2</b>	<b>Hrs / Sem: 30</b>	<b>Credit: 1</b>

## QUALITATIVE ANALYSIS

Analysis of a sample salt containing one anion and one cation

### Anions:

1. Carbonate
2. Sulphate
3. Nitrate
4. Chloride
5. Oxalate
6. Borate
7. Fluoride
8. Phosphate

### Cations:

1. Lead
2. Copper
3. Cadmium
4. Nickel
5. Manganese
6. Strontium
7. Ammonium

### Note:

- a. Elimination should be avoided.
- b. Interfering radicals with cations of group III, IV and V may be avoided

### Reference Books:

1. V.V. Ramanujam, Inorganic Semi Micro Qualitative Analysis, 3rd edition, The National Publishing Company, Chennai, 1974.
2. Vogel's Textbook of Quantitative Inorganic Analysis - A. I. Vogel, (Longman), Pearson education, India.
3. Advanced Practical Chemistry - R. Mukhopadhyay and P. Chatterje, 2007; Arunabha Sen, Books & Allied (P) Ltd., Kolkata.
4. Advanced Practical Chemistry - N. K. Vishnoi, 2005; Vikas Publishing House, New Delhi.
5. Advanced Course in Practical Chemistry - Ghoshal, Mahapatra & Nad, 2000; New Central Book Agency (P) Ltd., Kolkata.

III SEMESTER			
NME-I	LASER PHYSICS		18UNPH31
Hrs/Week: 2	Hrs/Sem: 2x15= 30	Hrs./ UNIT: 6	Credit: 2

### Objectives

- To understand the basics and fundamentals of lasers.
- To acquire in-depth knowledge of the applications of lasers in various fields.

### UNIT I: FUNDAMENTALS OF LASER

Spontaneous emission- stimulated emission- meta stable state- population inversion- pumping- Laser characteristics.

### UNIT II: TYPES OF LASER

Ruby Laser- Nd-Yag Laser – Gas Laser: He- Ne Laser- CO<sub>2</sub> Laser – Liquid: Dye Laser.

### UNIT III: LASERS IN ENVIRONMENTAL STUDIES

Air pollution monitoring – Water pollution monitoring- Examination of microorganisms with SCL- Laser remote sensing LIDAR- sensing wind velocity using LASERS.

### UNIT IV: INDUSTRIAL AND MEDICAL APPLICATIONS OF LASERS

Laser cutting, welding, drilling – Hologram- Recording reconstruction and applications of Hologram (In brief) - Lasers in surgery – Lasers in Cancer treatment.

### UNIT V: LASERS IN COMMUNICATIONS

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

### Books for Study:

1. Laser theory and applications – K. Thyagarajan and A.K. Ghatak, Mc Millan India Ltd., 1984.
2. An Introduction to Lasers – N. Avadhanulu, S. Chand & Company 2001.
3. Optic Fibres and Fibre Optic Communication Systems – Subir Kumar Sarkar, S. Chand & Company Ltd., New Delhi – 1997.

### Books for Reference:

Laser Fundamentals – William T. Silfvast – University Press, Published in South Asia by Foundation Books, New Delhi – 1998.

நான்காம் பருவம்			
PART – I - TAMIL			
TA 4	சங்கத் தமிழ்		18ULTA41
Hrs/Week: 6	Hrs/Sem: 90	Hrs/Unit: 18	Credits: 4

### நோக்கம்

1. சங்க இலக்கியம் குறித்த புரிதலை மாணவர்களுக்கு ஏற்படுத்துதல்.
2. இணையத்தில் தமிழின் இடத்தினை உணர்த்துதல்.
3. மாணவர்களை இணையத்தைப் பயன்படுத்த அறிவுறுத்துதல்.

### அலகு – 1 தமிழ்ச் செய்யுள் (துறை வெளியீடு)

- நற்றிணை (பாடல் எண்கள் 68-95),
- குறுந்தொகை (பாடல் எண்கள் 2, 23),
- ஐங்குநாறு (பாடல் எண்கள் 23, 49),
- பதிற்றுப்பத்து (பாடல் எண் 69),
- பரிபாடல் (செவ்வேள்-திருப்பரங்குன்றத்தின் அமைப்பும் சிறப்பும்-பாடல் எண்கள் 1 முதல் 20 வரை),
- கலித்தொகை (பாடல் எண் 10),
- அகநானூறு (பாடல் எண் 44),
- புறநானூறு (பாடல் எண் 187) மற்றும்
- பத்துப்பாட்டில் குறிஞ்சிப்பாட்டு முதல் 98 வரிகள்.

### அலகு – 2 நம்பிக்கைத் தமிழ் - கல்லூரித் தமிழ்த்துறை வெளியீடு,

### அலகு – 3 இணையமும் தமிழும்

- தமிழ் இலக்கியப் பதிவுகளும் இணையமும்
- இணையத்தில் படைப்பை வெளியிடும் முறைகள்
- தமிழ் விக்கிபீடியா-அறிமுகம்
- வலைப்பூக்களை உருவாக்க மாணவர்களுக்குப் பயிற்சிதரல்
- தமிழ் மின் நூலகம்
- மின் நூல்களும் வாசகத்தன்மையும்
- புகழ்பெற்ற தமிழ் இலக்கியத் தளங்கள் குறித்த அறிமுகம்.

### அலகு – 4 இலக்கியவரலாறு

- சங்க இலக்கியம் ஓர் அறிமுகம்
- எட்டுத்தொகை, பத்துப்பாட்டு
- சங்கஇலக்கியத் திணைக் கோட்பாடும் சங்ககால மக்கள் வாழ்வியலும்

### அலகு – 5 இலக்கணம்

- தமிழர் வாழ்வில் அகமும் புறமும்
- ஐவகைநிலங்களின் முதல், கரு, உரிப் பொருட்கள்
- அறத்தொடு நின்றல்
- களவு, கற்பு விளக்கம்
- புறத்திணைகள்

**பார்வை நூல்கள்**

தமிழ்க் கணினி இணையப் பயன்பாடுகள் - முனைவர் துரை. மணிகண்டன்  
 த. வானதி  
 கமலினிபதிப்பகம்  
 கச்சமங்கலம் அஞ்சல்,  
 தோகூர் வழி,  
 தஞ்சாவூர் மாவட்டம்

இணையத் தமிழ்

- தமிழ்த்துறை வெளியீடு  
 சதக்கத்துல்லாஹ் அப்பா கல்லூரி  
 திருநெல்வேலி.

**வழிகாட்டு இணையதளங்கள்**

1. [www.selliyal.com](http://www.selliyal.com)
2. [www.tamilvu.org](http://www.tamilvu.org)
3. [www.tamilcanadian.com](http://www.tamilcanadian.com)
4. [www.bbc.com](http://www.bbc.com)
5. [www.tamilinayam.com](http://www.tamilinayam.com)

	<b>SEMESTER - IV</b>		
<b>AR 4</b>	<b>CLASSICAL PROSE</b>		<b>18ULAR41</b>
<b>Hrs/ Week: 6</b>	<b>Hrs/ Sem: 90</b>	<b>Hrs/ Unit: 18</b>	<b>Credits:4</b>

**Objectives:**

To impart the moral values in the students and build their personality to make them better citizens to serve the society.

**UNIT I****Verses from 1 to 12 from (Sura – al – Hujraat)(Textbook – 1)**

من الآية "يا أيها الذين آمنوا لا تقدموا" إلى الآية "يا أيها الذين آمنوا اجتنبوا"

**UNIT II****Verses from 10 to 18 from (Sura – al – Hujraat)& verses from Surah Luqman from (12 to 19) (Textbook – 1)**

من الآية "يا أيها الناس إنا خلقناكم" إلى الآية "إن الله يعلم غيب السموات"  
من الآية "ولقد آتينا لقمان الحكمة" إلى الآية "واقصد في مشيك"

**UNIT III****Collection and compilation of Quran and Hadeeth, History of Imam Abu Hanifa, Malik, Asshafi, Ahmad, Bukhari, Muslim, Abu Dawood, At-Tirmidi, An-Nasaee and Ibn-Majah (Textbook – 1)****UNIT IV****Hadeeth 1 to 10 (Textbook – 2)**

من الحديث "لا تأكلوا بالشمال" - إلى الحديث "خيركم من تعلم القرآن"

**UNIT V****Hadeeth 11 to 20 (Textbook – 2)**

من الحديث "لا تمنعوا نساءكم" - إلى الحديث "حق المسلم على المسلم خمس"

**TEXTBOOKS**

1. Tafseer Suratul Hujuraath and from Suraah Luqman (verses from 12-19) A study material prepared by Dept. of Arabic, Sadakathullah Appa College, Rahmath Nagar, Tirunelveli-11
2. Hadeeth: Ahadeeth Sahlah, Available at: Islamic foundation Trust, 78, Perambur High Road, Perambur, Chennai- 600 012.

IV SEMESTER			
EN 4	A PRACTICAL COURSE IN SPOKEN ENGLISH		18ULEN41
Hrs/ Week: 6	Hrs/ Sem: 90	Hrs/ Unit: 18	Credits: 4

**Objectives:**

1. To express one's needs orally in a fluent, simple and direct style.
2. To pronounce words intelligibly
3. To use the right intonation pattern in speech.

**UNIT I**

Interactive Expressions and Pronunciation Practice: Consonants  
(Chapters 1 – 3 of *A Course in Spoken English*)

**UNIT II**

Introducing oneself / others, patterns for greeting, requesting, expressing and responding to thanks and etc., & Pronunciation Practice: Vowels (Chapters 4 – 8 of *A Course in Spoken English*)

**UNIT III**

Developing descriptive competency, narrative competency, arguing competency, comparing competency and pronunciation practice: Diphthongs (Chapters 9 – 13 of *A Course in Spoken English*)

**UNIT IV**

Practising continuous speech, group discussion and pronunciation practice: Word Accent and Intonation  
(Chapters 14 – 19 of *A Course in Spoken English*)

**UNIT V LISTENING PRACTICE**

Students will listen to audio and video materials for 10 – 12 hours.

**Textbook, Workbook, Record Note:**

1. Nihamathullah. A. et al. *A Course in Spoken English*. Tirunelveli: MSU, 2005. (rpt.2010).
2. Board of Editors, Department of English, Sadakathullah Appa College, *A Workbook for A Course in Spoken English*, 2011.
3. Spoken English Practice Record.

**Evaluation Scheme:**

I Internal Oral Test : 15 Marks	}	The best two of the three CIA test marks will be added up
II Internal Oral Test : 15 Marks		
III Internal Oral Test: 15 Marks		

**Distribution of Marks**

The best two of the three CIA test marks	: 30 Marks
Loud Reading	: 5 Marks
Listening Test	: 5 Marks
Internal Marks	: 40 Marks
External Oral Test	: 50 Marks
Record Note	: 05 Marks
Workbook	: 05 Marks
External Marks	: 60 Marks



IV SEMESTER			
<b>DSC 6</b>	<b>Laser and its applications</b>		<b>18UCPH41</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4x15= 60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit:4</b>

### Objectives

- To understand the fundamentals of lasers.
- To acquire in-depth knowledge of the applications of lasers in various fields.

### UNIT I PRINCIPLES OF LASERS

Absorption, spontaneous & stimulated emission of radiation-Basic principle of laser – characteristics of laser--Einstein's coefficients-Relation between Einstein's A and B Coefficients-Laser operation-Pumping-Population inversion-Expression for threshold gain-active medium-Optical feedback.

### UNIT II OPTICAL RESONATOR

Resonators-types of resonators-Cavity stability and ABCD matrix – stability diagram –modes of resonators-open planar resonator –laser threshold-Q-factor-Q-switching-coherence and directionality of laser.

### UNIT III TYPES OF LASER

Solid state lasers-Ruby laser - Nd:YAG laser-semiconductor laser - Nd:glass laser - Gas lasers - He:Ne laser- CO<sub>2</sub> laser-Argon ion laser-Liquid laser –Dye laser.

### UNIT IV APPLICATIONS OF LASERS

Laser drilling –laser welding-laser cutting-lasers in environmental analysis-laser remote sensing –LIDAR-Raman LIDAR-Applications of lasers in medicine and surgery.

### UNIT V LASERS IN HOLOGRAPHY

Principle of Holography –recording and reconstruction of Hologram-Characteristics of Holograms-Types of Holograms-Applications of Holography (Holographic Interferometry, Holographic computer memories, Data encoding and in Hologram and non-destructive testing of artificial heart valves).

### Books for Study:

1. Laser theory and application-K. Thyagarajan and A.K. Ghatak, McMillan, India Ltd, 1984.
2. An introduction to lasers- N. Avadhanulu, S. Chand & Company (2001).

### Books for Reference:

1. Laser fundamentals, William T.Silfvast-University press, Published in south Asia by foundation Books, New Delhi,1998.
2. Optic Fibres and Fibre Optic Communication Systems – Subir Kumar Sarkar, S. Chand& Company Ltd., New Delhi, 1997

IV SEMESTER			
DSE 2A	PROGRAMMING IN C++		18UEPH4A
Hrs/Week: 4	Hrs/Sem: 4x15= 60	Hrs./ UNIT: 12	Credit:4

**Objectives:**

- To understand the concepts of OOP.
- To acquire the knowledge about the various C++ operators and control structures.
- To develop C++ using concepts of OOP and to execute.

**UNIT I Basics Concepts of OOPS and C++**

Basic concepts of object – oriented programming, application of OOP, What is C++, application of C++, a simple C++ program, structure of C++ program- Keywords - Identifiers and constants – Basic data types-declaration of variables – C++ operators -manipulator functions.

**UNIT II Control structure, functions and arrays**

if, if – else and switch statement – loop statements (do – while, while, for) – breaking control statements (break, continue and go to) – Defining a function – types of functions, actual and formal arguments and default arguments – Arrays(declaration and initialization).

**UNIT III Classes, objects, constructors and destructors**

Specifying a class, defining member functions, nesting of member functions, arrays within a class, arrays of objects, Constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, destructors

**UNIT IV Operator overloading, inheritance**

Defining operator overloading, overloading unary and binary operators, rules for overloading operators - Defining derived class, single inheritance, multilevel inheritance, multiple inheritance, Hierarchical inheritance and hybrid inheritance.

**UNIT V Pointers, File handling**

Introduction to pointers, Pointer declaration, pointer arithmetic, pointer and arrays, Arrays of pointers, C++ streams, C++ stream classes, unformatted I/O operations, formatted console I/O operations, managing output with manipulators- How to open and close a file?.

**Book for Study:**

1. Object Oriented Programming with C++ – E. Balagurusamy, Tata McGraw-Hill Publishing Company Ltd., New Delhi (4<sup>th</sup> ed.).
2. Programming with C++ – D. Ravichandran – Tata McGraw-Hill Publishing Company Ltd., New Delhi (3<sup>rd</sup> ed.).

**Books for Reference:**

Object Oriented Programming in C++ – Robert Lafore –Course Sams Publishing-4<sup>th</sup> edition.

IV SEMESTER			
DSE 2B	Mathematical Physics		18UEPH4B
Hrs/Week: 4	Hrs/Sem: 4x15= 60	Hrs./ UNIT:12	Credit:4

**Objectives:** To understand the various mathematical methods used in Physics

#### **UNIT I: Linear Vector space and Matrices**

Vector operations in curvilinear coordinates (Rectangular and Spherical coordinates)- Linear independence of vector- Basis- Inner product- Matrix-Types of Matrix- Eigen values and Eigenvectors of a matrix.

#### **UNIT II Fourier series:**

Periodic functions-Dirichlet conditions (statement only)- Expansion of periodic functions in a series of sine and cosine functions and determination of Fourier coefficients.

#### **UNIT III Group Theory:**

Concepts of Group- Examples of group - Abelian, Cyclic groups-subgroup - Group multiplication table- Group symmetry and equilateral triangle - Group symmetry and a square.

#### **UNIT IV: Complex analysis**

Brief revision of complex numbers and their graphical representation- Euler's function- De Moivre's theorem- Roots of complex numbers- function of complex variable- Analyticity and Cauchy Riemann conditions- example of analytic function.

#### **UNIT V: Frobenius method and special function**

Singular points of second order linear differential equations and their importance- Frobenius method and its applications to differential equations- Legendre, Bessel and Hermite functions.

#### **Books for Study:**

1. Mathematical Physics, B. D. Gupta, Vikas Publishing House, (2009)
2. Mechanics and Mathematical Physics, R. Murugesan, S. Chand & Company Ltd., New Delhi, Third Revised Edition (2008).

#### **Books for Reference:**

1. Mathematical methods for Physicists – Arfken & Weber – 6<sup>th</sup> Edition-Academic Press- N.Y.1990.
2. Mathematical Physics- Sathya Prakash - Sulthan Chand and Sons - New Delhi.

<b>PART III - ALLIED II – CHEMISTRY</b> <b>(Offered by Chemistry Department to Physics Students)</b>			
<b>IV SEMESTER</b>			
<b>AII 2</b>	<b>ALLIED CHEMISTRY - II</b>		<b>18UACH41</b>
<b>Hrs / Week: 4</b>	<b>Hrs / Sem: 60</b>	<b>Hrs / Unit: 12</b>	<b>Credit: 3</b>

**Objective:**

- To study about petroleum products and fertilizers
- To learn about detergents and pesticides.
- To have an idea about pharmaceutical chemistry.
- To understand about polymers.
- To study the physical properties and structure of molecules.

**UNIT I - PETROLEUM AND FERTILIZERS**

Refining of petroleum, Composition and uses of petroleum fractions, Thermal cracking and catalytic cracking, Octane number, Cetane number and flash point, Advantages of catalytic cracking. Antiknock agents, unleaded petrol, Petrochemicals (Direct and Indirect), Synthetic petrol – Fischer Tropsch process. Fertilizers, Role of micro and macro nutrients in plant growth, Manufacture of urea, Triple super phosphate, Ammonium fertilizers, Mixed fertilizers and Bio fertilizers.

**UNIT II - DETERGENTS AND PESTICIDES**

Detergents, Manufacture of soap (Toilet, transparent and liquid soaps), Detergents, Difference with examples.

Disinfectants and antiseptics, Distinction, Various types, Examples and applications, Pesticides, Classification with examples, Preparation of Lead arsenate, Parathion, Bordeaux mixture, Zineb, DNOC and Aluminium phosphide.

**UNIT III - PHARMACEUTICAL CHEMISTRY**

Preparation and uses of the following:

- a) Antiseptic- Alum, Boric acid, Zinc oxide, Potassium permanganate, Gentian violet and Dettol.
- b) Mouth washes- Hydrogen peroxide.
- c) Antacids- Aluminum hydroxide and Magnesium silicate.
- d) Antidiarrhoeals- Light kaolin.
- e) Antifungals- Hypo and Griseofulvin.
- f) Emetics- Tatar emetic.
- g) Sedatives- Diazepam, Biurets and Alkyl ureas.
- h) Expectorants- Ammonium chloride and Potassium citrate.
- i) Hemationics- Ferrous fumarate and Ferrous gluconate.
- j) Laxatives- Epsom salt and Milk of magnesia.
- k) Dental cement- Zinc oxide and Silver amalgam.

**UNIT IV – POLYMERS CHEMISTRY**

Polymers – definition – monomers, oligomers and polymers. Classification of polymers – natural, synthetic, linear, cross-linked and network plastics. Plastics, Elastomers and fibres. Thermoplastics- Polyethylene, poly propylene, Poly styrene, Poly vinyl chloride, nylon and polyester. Thermosetting plastics – Phenol formaldehyde and Epoxy resins. Rubber –preparation and uses of buna-N, buna – S and neoprene.

**UNIT V - PHYSICAL PROPERTIES AND STRUCTURE**

Dipole moment, Definition and expression, Applications (Molecular Geometry-Cis-trans isomerism and disubstituted benzene derivatives).

Dia, Para and Ferro magnetism, Magnetic susceptibility and magnetic moment, Measurement using Gouy balance, Application of magnetic properties. Principle and application of column, thin layer and paper chromatography.

**Books for Reference:**

1. Industrial Chemistry – B.K. Sharma, Goel Publishing House, Meerut.
2. Polymer science - V.R Gowarikar, N.V Viswanathan and J. Sreedhar 2000; New Age International (P) Ltd., New Delhi.
3. Textbook of polymer science - F.W. Billmeyer.1984; A Wiley–IntersciencePublication, John Wiley & Sons New York.
4. Textbook of polymer science - P.L. Nayak & S. Lenka, 2000; Kalyani publishers, New Delhi.
5. Textbook of Pharmaceutical Chemistry – Jeyashree Gosh – 2003, S. Chand and Company, New Delhi.
6. Medicinal Chemistry – G. R. Chatwal, 2002, Himalaya Publishing House, New Delhi.
7. Principles of Physical Chemistry - B. R. Puri, L. R. Sharma, Madan S. Pathania, 2004, Vishal publishing co. - New Delhi.
8. Fundamentals of Analytical Chemistry - D.A. Skoog, D.M. West, F.J. Holler and S.R. Crouch 2004; Thompson Asia Private Ltd., Bangalore.
9. Instrumental Methods of Analysis - B. K. Sharma, 2003; Goel publishing House, Meerut, India.
10. An introduction to Chromatography - H. Kaur, 2001: Pragati Prakashan, Meerut, India.
11. Instrumental Methods of Chemical Analysis, Gurdeep R. Chatwal and Sham Anand, 1997, Himalaya Publishing House, Mumbai.

IV SEMESTER		
<b>CP 4</b>	<b>PHYSICS PRACTICALS - IV</b>	<b>18UCPH4P1</b>
<b>Hrs/Week: 2</b>	<b>Hrs/Sem: 2x15= 30</b>	<b>Credit:1</b>

- 1) A) Write a C++ to read any two numbers through the keyboard and to perform simple arithmetic operations (i.e. addition, subtraction, multiplication and division) and display the result using **cin** and **cout** functions. Use **do-while** loop.  
 B) Write a C++ to find the sum of the series using **for loop**.
  - a)  $\text{Sum} = 1 + 3 + 5 + \dots + n$
  - b)  $\text{Sum} = 1 + 2^2 + 4^2 + \dots + n^2$
- 2) Write a C++ to find the factorial of a number by using **function declaration** with/without using the return statement.
- 3) Write a C++ to read a set numbers from a standard input device and to find out the largest number in the given array using **function declaration**. Also sort them in the ascending or the descending order.
- 4) Write a C++ to read the elements of the given two matrices of order  $m \times n$  and to perform the matrix addition and display the transpose of the result.
- 5) Write a C++ to **define a class** to represent a bank account
 

**Data members**

  - i) Name of the depositor
  - ii) Account number
  - iii) Type of Account
  - iv) Balance amount in the account

**Member functions**

  - i) To assign the initial values
  - ii) To deposit an amount
  - iii) To withdraw an amount
  - iv) To display name and balance
- 6) Write a C++ to generate a series of Fibonacci numbers using **constructor** where the constructor member function has been defined in the scope of class definition out of the definition using the scope resolution operator.
- 7) Write a C++ to read the following information from the keyboard in which basic class consists of Name, Roll No. and sex. The derived class contains the data member's height and weight. Display the contents of the class using **inheritance concept**.
- 8) Write a C++ to find the period of a pendulum of given length  $L$ , in a gravitational field. Accept the required values using the keyboard. Also display the results.
- 9) Develop a program in C++ to calculate the Young's modulus of a material from the data obtained from uniform bending method.
- 10) Write a C++ to calculate the thickness of a wire by air wedge method.

**Books for Reference:**

Programming with C++ – D. Ravichandran – Tata McGraw Hill Publishing Company Ltd., New Delhi (3<sup>rd</sup> ed.)

IV SEMESTER		
<b>AII P2</b>	<b>INORGANIC QUANTITATIVE ANALYSIS</b>	<b>18UACH4P1</b>
<b>Hrs / Week: 2</b>	<b>Hrs / Sem: 30</b>	<b>Credit: 1</b>

### VOLUMETRIC ANALYSIS

#### Acidimetry - alkalimetry:

1. Estimation of Sodium Hydroxide - Sodium Carbonate standard and HCl link.
2. Estimation of Sulphuric Acid - Oxalic acid standard and Sodium Hydroxide link.
3. Estimation of Sodium carbonate - Sodium carbonate standard and HCl link.

#### Permanganometry:

4. Estimation of Ferrous ion - Ferrous ammonium sulphate standard and  $\text{KMnO}_4$  link.
5. Estimation of Sodium Oxalate - Oxalic acid standard and  $\text{KMnO}_4$  link.
6. Estimation of Oxalic acid - FAS standard and  $\text{KMnO}_4$  link.

#### Complexometry:

7. Estimation of Zinc by EDTA method - Standard Zinc sulphate and EDTA link.
8. Estimation of Magnesium by EDTA method - Standard Magnesium sulphate and EDTA link

#### Reference Books:

1. Vogel's Textbook of Quantitative Inorganic Analysis - A. I. Vogel, (Longman), Pearson education, India.
2. Advanced Practical Chemistry - R. Mukhopadhyay and P. Chatterje, 2007; Arunabha Sen, Books & Allied(P) Ltd., Kolkata.
3. Advanced Practical Chemistry - N. K. Vishnoi, 2005; Vikas Publishing House, New Delhi.
4. Advanced Course in Practical Chemistry - Ghoshal, Mahapatra & Nad, 2000; New Central Book Agency (P) Ltd., Kolkata.

IV SEMESTER			
NME-II	Applied Physics		18UNPH41
Hrs/Week: 2	Hrs/Sem: 2x15= 30	Hrs./ UNIT: 6	Credit: 2

### UNIT I ENERGY SOURCES I

World's reserve of commercial energy sources – Various forms of energy – Renewable energy sources-: sunlight, wind and waves, the tides, biomass, geothermal energy- Conventional energy sources: coal, oil, natural gas, nuclear power – Comparison between conventional sources of energy and non- conventional energy sources.

### UNIT II ENERGY SOURCES II

Solar cell- Solar crop dryers – Solar water heater – Biomass energy- Deena Bandhu model of gohar gas plant – Windmill.

### UNIT – III CLIMATE AND CLIMATE CHANGE

Climate: its classification; causes of climate change; global warming and its outcomes; air pollution; aerosols, ozone depletion, acid rain, environmental issues related to climate and control measurements.

### UNIT IV DOMESTIC WIRING

Introduction – Types of tools – Precaution in handling tools used for wiring – Wires- Cabels – System of domestic wiring – Good grounding and its need – Fuses- Switch wiring.

### UNIT V ELECTRICAL APPLIANCES

Electric bell – Electric kettle – Electric iron – Fan connection – Washing machine – Refrigerator- Freezer- Water cooler.

#### Books for Study:

1. Non-Conventional Energy sources – G. D Rai – Khanna publishers
2. Applied Physics- G. Jose Robin and A. Ubald Raj – Indira Publishers
3. Operation and Maintenance of electrical appliances Vol I & II by B V S Rao - Asia Publishing House, 1977

#### Books for Reference:

1. Solar Energy – Sukhatme – Tata McGraw Hill - 1996
2. Electronic Instrumentation – By Kalsi
3. Principles of Electronics – V.K.Mehta S. Chand & Co. NewDelhi  
*Revised Edition*



<b>V SEMESTER</b>			
<b>DSC 7</b>	<b>Modern Physics</b>		<b>18UCPH61</b>
<b>Hrs/Week:6</b>	<b>Hrs/Sem: 6x 15 = 90</b>	<b>Hrs./ UNIT: 18</b>	<b>Credit: 4</b>

**Objectives:**

- To learn the basic concepts of atomic and nuclear structure.
- To gain the knowledge of nuclear transformations.
- To understand the concepts related to relativity.

**UNIT I Atomic structure**

The nuclear atom - Electron orbits – The failure of Classical Physics- Atomic spectra - The Bohr atom - Energy levels and spectra - Correspondence principle - Nuclear Motion- Atomic excitation-Frank-Hertz experiment.

**UNIT II Particle and wave nature**

Electromagnetic waves - blackbody radiation - Photo electric effect - X-rays- X-ray Diffraction- Compton effect- De Broglie waves- Describing a wave - Phase and Group velocities - Particle diffraction - particle in a box- Uncertainty principle – proof - Applications.

**UNIT III Nuclear Structure**

Nuclear composition – properties - Stable nuclei - Binding energy - Liquid drop model - Shell model - Nuclear forces - characteristics-Meson theory of nuclear forces.

**UNIT IV Nuclear transformations**

Radioactive decay - Half life - Radioactive series - Alpha Decay - beta decay - Gamma decay - Nuclear reactions - Nuclear fission - Nuclear Reactors - Nuclear fusion in stars - Fusion Reactors.

**UNIT V Relativity**

Special theory of Relativity - Time dilation - Doppler effect - Length contraction - Twin paradox - Relativity of mass - Mass and Energy- Mass less particles- General relativity.

**Books for Study:**

1. Concepts of Modern Physics, Arthur Beiser, Tata McGraw Hill (6<sup>th</sup> edition, 2009).
2. Modern Physics – R. Murugesan and Kiruthiga Sivaprasath — S. Chand & Co., New Delhi (17<sup>th</sup> Revised Edition, 2014).

**Books for Reference:**

1. Modern Physics – A.B. Gupta, Books and Allied Pvt. Ltd., (First ed., 2006)
2. Atomic and Nuclear Physics-D.C. Tayal, Himalaya Publishing Home, Mumbai - 400004.

V SEMESTER			
<b>DSC 8</b>	<b>BASIC ELECTRONICS</b>		<b>18UCPH52</b>
<b>Hrs/Week: 5</b>	<b>Hrs/Sem:5 x 15 = 75</b>	<b>Hrs./ UNIT: 15</b>	<b>Credit: 4</b>

**Objectives:**

- To study the working principles of different types of transistor amplifier and oscillators.
- To learn the functioning of different types of diodes and FETs.
- To study the characteristics and applications of an operational amplifier.

**UNIT I Transistor amplifier**

Faithful amplification – transistor biasing – inherent variations of transistor parameters – stabilization – stability factor – methods of transistor biasing – practical circuit of a transistor amplifier – phase reversal – DC and AC equivalent circuits – load line analysis – classification of amplifiers – multistage amplifiers – important terms – RC coupled amplifier – transformer coupled amplifier – direct coupled amplifier.

**UNIT II Transistor audio power amplifiers**

Difference between voltage and power amplifier – performance quantities of power amplifiers – classification of power amplifiers – thermal runaway – heat sink – stages of a practical power amplifier – driver stage – output stage – push pull amplifier – feedback – principles of negative feedback – advantages – emitter follower – applications of emitter follower.

**UNIT III Oscillators**

Oscillatory circuit – Positive feedback – essentials of transistor oscillator – Barkhausen criterion – tuned collector, Hartley, Colpitt and phase shift oscillators – Wien bridge oscillator – transistor crystal oscillator – multi vibrators – astable, mono stable, bistable multi vibrators.

**UNIT IV Special diodes and FETs**

LED – LED voltage and current – advantages – multicolor LEDs – applications of LEDs – photo diode – characteristics – tunnel diode – tunnel diode oscillator – varactor diode – applications – Shockley diode – JFET – construction, working – differences between JFET and BJT – JFET characteristics – parameters – MOSFET – D-MOSFET – E-MOSFET.

**UNIT V Op-amp –characteristics and Application**

Open-loop and Closed-loop Gain - Frequency Response - CMRR -Slew Rate and concept of Virtual ground. **Applications of Op-Amps:** (1) Inverting and non-inverting amplifiers, (2) Adder, (3) Subtractor, (4) Differentiator, (5) Integrator, (6) Log amplifier, (7) Zero crossing detector (8) Wien's bridge oscillator.

**Books for Study:**

1. Principles of Electronics – V.K. Mehta and Rohit Mehta – S. Chand & Co. Ltd., New Delhi – 110055.
2. Op-Amps and Linear Integrated Circuit, R. A. Gayakwad, (4<sup>th</sup> ed., 2000), Prentice Hall.

**Books for Reference:**

1. Electronic principles – Albert Paul Malvino and David J Bates, Tata McGraw Hill Ltd., (7<sup>th</sup> Ed, 2006).
2. Electronic fundamentals and applications- John D Ryder, Prentice Hall India Pvt. Ltd., New Delhi (5<sup>th</sup> ed., 2002).
3. Integrated Electronics – Jacob Milman and Christos C Halkias, Tata McGraw Hill Publishing Company Ltd., New Delhi (28<sup>th</sup> reprint, 2003).

V SEMESTER			
<b>DSC 9</b>	<b>DIGITAL ELECTRONICS</b>		<b>18UCPH53</b>
<b>Hrs/Week: 5</b>	<b>Hrs/Sem: 5 x 15 = 75</b>	<b>Hrs./ UNIT: 15</b>	<b>Credit: 4</b>

**Objectives:**

- To study the various numbers systems used in digital electronics.
- To acquire the knowledge about basic logic gates, sequential, combinational and data processing circuits.
- To study the basic concepts of flip flops and to design the counter and registers.
- To understand the basic principles of various D/A and A/D techniques.

**UNIT I Number systems – Codes, Arithmetic circuits**

Decimal, Binary, Octal, Hexadecimal numbers – conversion from one to another – ASCII code, Excess 3 code, BCD, Gray code – binary addition – subtraction, unsigned binary numbers, overflow, signed magnitude numbers, 2's complement method – Basic and derived logic gates (OR, AND, NOT, NOR, NAND, EX – OR), NAND and NOR as universal gates – Demorgan's laws, – Half adder, full adder, half subtractor, full subtractor.

**UNIT II Combinational logic and Data processing circuits**

Boolean laws and theorems- sum of product method- Karnaugh map – truth table to Karnaugh map (2,3 and 4 variables)- Pairs, Quads and Octets– Don't care conditions – Multiplexers – demultiplexers – Decoder – BCD to decimal decoder – seven segment decoders – encoders – decimal to BCD encoder – parity generators – checkers- ROM.

**UNIT III Clocks, Flip – flops**

Introduction to 555 timer – astable multivibrator – monostable multivibrator – Bistable multivibrator – flip flops – RS flip flop – implementation of RS flip flop using NOR, NAND gates – clock pulses – clocked RS, D flip flop – JK flip flop – JK master – slave flip flop – T flip flop.

**UNIT IV Registers and Counters**

Types of registers – Serial In – Serial Out, Serial in - Parallel out, Parallel in – Serial out, Parallel in - Parallel out, Applications of Shift registers - Ring counters – Asynchronous counters –Decoding gates- synchronous counters – up – down counters (Bi direction counters) – MOD counters – Decade Counters.

**UNIT V D/A, A/D Conversion**

D/A converter – variable resistor network & binary R – 2R ladder type – D/A Accuracy and resolution A/D converter – Simultaneous conversion- Counter method- Continuous A/D conversion- A/D techniques-Dual slope A/D conversion- A/D Accuracy and resolution

**Books for Study**

1. Digital principles – Donald P. Leach, A.P. Malvino & Goutam Saha – Tata McGraw Hill Education Private Ltd., New Delhi (7<sup>th</sup> ed., 2011).
2. Digital Fundamentals -Thomas L. Floyd, Pearson Education Inc, New Delhi, (8<sup>th</sup> ed., 2003).

**Books for Reference:**

1. Digital Design - M. Morris Mano, 3rd Edition, Prentice Hall of India Pvt. Ltd., (3<sup>rd</sup> ed., 2003). / Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2003.
2. Modern Digital Electronics – R.P. Jain, Tata McGraw Hill Publishing Company Ltd., New Delhi (10<sup>th</sup> reprint, 2006).
3. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, 3<sup>rd</sup> Edition, Vikas Publishing House Pvt. Ltd, New Delhi, 2006.

V SEMESTER			
<b>DSE 3A</b>	<b>INTRODUCTION TO NANOTECHNOLOGY</b>		<b>18UEPH5A</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4 x 15 =60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit:4</b>

**Objectives:**

- To learn the methods to synthesize nanoparticles.
- To acquire the knowledge about the various techniques to characterize nanoparticles.
- To study the applications of nanotechnology in different fields.

**UNIT I Fabrication of nanostructures**

Background and evolution of Nanotechnology – size of nano – solid state synthesis – vapour phase synthesis – inert gas condensation – plasma based synthesis – flame based synthesis – spray pyrolysis – solution processing of nanoparticles – Sol gel processing – water – oil micro emulsion method.

**UNIT II Characterization on nanostructures**

Lithography techniques – electron beam lithography – Dip – pen lithography – photo lithography – thin film deposition – electro spinning – Atomic force microscope – FTIR – Differential scanning calorimetry – Scanning electron microscope – Transmission electron microscope.

**UNIT III Applications of nanotechnology**

Fabrication, properties and applications of quantum dots – quantum wires – quantum well – Fullerenes – carbon nano tubes – quantum point contact – nano crystals and their applications- Nano Electronics- Moore's law.

**UNIT IV Nano medicine and nano biology**

Basic concepts – nano biotechnological devices – applications nano biotechnology – biosensors – nano biosensors – applications of nano biosensors – nano DNA technology – building blocks of DNA – DNA sensors – Optical biosensors.

**UNIT V Environmental implications of Nanotechnology**

Pollution prevention – Areas of Pollution prevention – Environmentally beneficial Nano Technology – Water Purification – Water decontaminator – Water desalination – Nano toxicology – Green Nano Technology – Positive and Negative aspects of N.T – Environmental implications of N.T.

**Books for Study:**

1. Nano Biotechnology – Subbiah Balaji – MJP Publishers, Chennai.
2. Nano technology – S. Shunmugam – MJP Publishers, Chennai (2010).

**Books for Reference:**

1. Nano technology – an introduction – Mark Ratner and Daniel Ratner – 3<sup>rd</sup> edition – Pearson Education –New Delhi.
2. Introduction to Nanotechnology- Charles P Poole Jr, Frank J Owens, John Wiley Sons Publications.

<b>V SEMESTER</b>			
<b>DSC 3B</b>	<b>Microprocessor and Programming</b>		<b>18UEPH5B</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4 x 15 =60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit:4</b>

**Objectives:**

- To understand the basic concepts of microprocessor, instructions sets and assembly language programming

**UNIT I**

Functional block diagram of a microcomputer - Development of microprocessor – Pin configuration of microprocessor of 8085 – power supply - address bus – Multiplexed address/data bus – control and status signals- interrupt signals –clock signals- hand shake signals – reset signals

**UNIT II**

Architecture of microprocessor 8085 – Word length –registers – ALU – Accumulator – stack pointer – program counter – Instruction register – Instruction decoder & machine cycle encoder – timing and control unit - Flags – PSW –internal data bus –Instruction format – Mnemonics – Classification of instructions of 8085 based on their length with examples

**UNIT III**

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

**UNIT IV**

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

**UNIT V**

Interfacing: Interfacing memory to 8085-interfacing 2k X 8 ROM and RAM, Timing diagram of 8085-interfacing input and output port to 8085-Programmable peripheral interface-8255.

**Books for Study:**

1. Microprocessor Architecture, Programming and Applications with the 8085 - Ramesh Gaonkar, Penram International Publishing, (4<sup>th</sup> ed).
2. Fundamentals of Microprocessor and Microcontrollers- B. Ram, Dhanpat Rai Publications (7<sup>th</sup> ed., reprint 2013).

**Books for Reference:**

1. Introduction to Microprocessor- Aditya P. Mathur, Mc Graw Hill (1990).
2. Fundamental of Microprocessor 8085: Architecture Programming, and Interfacing - V. Vijayendran, S. Viswanathan Printers & Publishers PVT Ltd (2009).

V SEMESTER		
<b>CP 5</b>	<b>PHYSICS PRACTICALS -V</b>	<b>18UCPH5P1</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 60</b>	<b>Credit: 2</b>

1. To determine the Cauchy Constants of a material of a prism.
2. Determination of refractive index – i – d curve.
3. To determine wavelength of sodium light using Fresnel Bi-prism.
4. Absolute capacity and figure of merit - BG
5. Comparison of Mutual inductances - BG.
6. To study the variation of thermo emf across two junctions of a thermocouple with temperature.
7. Conversion of Galvanometer into voltmeter and ammeter.
8. Measurement of Planck's constant using black body radiation.
9. Owen's bridge – Determination of self-inductance.
10. To calibrate the high range voltmeter- Potentiometer.

#### Books for Reference:

1. Ouseph, Srinivasan & Vijayendran, Practical Physics
2. P. R. Sasi Kumar, Practical Physics –, PHI.
3. S. P. Singh, Advanced Practical Physics, Pragathi Prakasam.
4. Practical Physics – St. Joseph College, Trichy.
5. A Textbook of Practical Physics, Indu Prakash and Ramakrishna, 11<sup>th</sup> ed.

V SEMESTER		
<b>CP 6</b>	<b>PHYSICS PRACTICALS -VI</b>	<b>18UCPH5P2</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 60</b>	<b>Credit: 2</b>

- 1) Zener regulated power supply
- 2) Characteristics of FET
- 3) To construct and study the response of a Single stage amplifier –without feedback
- 4) Colpitt's oscillator
- 5) To design an astable multivibrator of given specifications using 555 Timer.
- 6) Verification of Adder, Subtractor using Op – amp
- 7) To verify and design AND, OR, NOT and XOR gates using NAND gate
- 8) Half adder & full adder using ICs
- 9) To study the characteristics of Photo Voltaic cell
- 10) To study the characteristics of Photo Transistor.

#### Books for Reference:

1. Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 1994, Mc-Graw Hill.
2. Electronics: Fundamentals and Applications, J.D. Ryder, 2004, Prentice Hall.
3. OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall.

V SEMESTER			
<b>SEC-I</b>	<b>Medical Physics</b>		<b>18USPH51</b>
<b>Hrs/Week: 2</b>	<b>Hrs/Sem: 2x15= 30</b>	<b>Hrs./ UNIT: 6</b>	<b>Credit: 2</b>

**Objectives:**

- To study the human physiological systems
- To have an exposure on various diagnostic instruments used in the medical field and
- To study the basics of radiation and medical imaging physics.

**Unit I: Human Physiological Systems:**

Introduction-cells and their structure- Nature of cancer cells-transport of ions through the cell membrane. *Mechanics of the body*: Skeleton, forces and body stability. Muscles and dynamics of body movement. *Electrical system of the body*: physics of the nervous system, Electrical system and information transfer. *Energy household of the body*: Energy balance in the body, Energy consumption of the body, Heat losses of the body.

**Unit II: Bioelectric Signal Recording:**

Introduction, characteristics of recording systems, Electrocardiograph (ECG), Electroencephalograph (EEG), Electromyograph (EMG), Electroneurograph (ENG), recording units.

**Unit III: Diagnostic instruments:**

Blood flow meters-EM blood flow meter-Principle and applications-Ultrasonic blood flow meter- blood gas analyzer – pH meter-Oximeter-Digital thermometer-audio meter-angiography.

**Unit IV: Radiation Physics:**

Radiation units exposure, absorbed dose, units: rad, gray, relative biological effectiveness, effective dose, inverse square law. Interaction of radiation with matter Compton & photoelectric effect, Rem & Sievert, linear attenuation coefficient.

**Unit V: Medical Imaging Physics:**

X-ray machine- Radio graphic and fluoroscopic techniques- computer tomography- MRI- Ultrasonography-Endoscopy-Thermography-Medical applications of thermography-Different types of biotelemetry systems and patient monitoring.

1. Bio medical instrumentation- M. Arumugam, Anuradha Agencies (1997).
2. Bio medical instrumentation- Rekhas and Ravikumar
3. Medical Physics- J.R. Cameron and J.G. Skofronick, Wiley Eastern(1978)

VI SEMESTER			
<b>DSC 10</b>	<b>QUANTUM MECHANICS AND STATISTICAL MECHANICS</b>		<b>18UCPH61</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4 x 15 = 60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit:4</b>

**Objectives:**

- To understand the main features of quantum and statistical mechanics.
- To acquire the knowledge about the quantum mechanical operators.
- To give an insight to the applications of quantum mechanics to bound state problems.

**UNIT I General formalism of QM**

Wave function and its interpretation – Normalization of the wave function – symmetric and asymmetric wave functions – probability current density – stationary states – fundamental postulates of quantum mechanics – Schrodinger's time – independent wave equation – Schrodinger's time – dependent wave equation.

**UNIT II Operators and their properties**

Linear operators – identity operator – Hermitian operator – Ladder operator – Laplacian operator – momentum operator – K.E operator – Hamiltonian operator – eigen values and eigen functions of operators – uncertainty principle using operators – orbital angular momentum operator.

**UNIT III Bound state Problems**

Particle in a one-dimensional box – normalization of wave function – particle in a three dimensional box – degeneracy – rigid rotator – linear harmonic oscillator-Hydrogen atom.

**UNIT IV Basics of Statistical mechanics**

Probability – phase space – quantum states – micro states and macro states – fundamental postulates of statistical mechanics – thermodynamic probability – Liouville's theorem- Boltzmann's relation between entropy and probability – Maxwell – Boltzmann statistics – Bose – Einstein statistics – Fermi – Dirac statistics – comparison of the three statistics.

**Unit V Ensembles:**

Kinds of ensembles- micro canonical, canonical, Grand canonical ensembles and uses- comparison - Equipartition of energy- Partition function- relation to thermodynamic quantities - Gibbs paradox.

**Books for Study:**

1. Quantum mechanics – Gupta, Kumar and Sharma – Jai Prakash Nath & Co., Meerut (25<sup>th</sup> ed., 2008).
2. Thermodynamics and Statistical Mechanics - Brijlal Subramanian.

**Books for Reference:**

1. Quantum Mechanics – Mathews and Venkatesen, Second Edition, Tata Mc Graw Hill Educ. Pvt. Ltd., New Delhi.
2. Quantum Mechanics Statistical Mechanics & Solid-State Physics – S.P. Kuila, First Edition, Books and Allied (P) Ltd. Kolkata.



VI SEMESTER			
<b>DSC 11</b>	<b>Solid State Physics</b>		<b>18UCPH62</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4 x 15 = 60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit: 4</b>

**Objectives:**

- To acquire the knowledge about the structures and diffraction of crystals and to study the imperfections in it.
- To understand the dielectric, magnetic properties of matter and super conductivity phenomena.

**UNIT I: CRYSTAL STRUCTURE**

Crystal lattice - Unit cell and lattice parameters – Crystal systems – Bravais lattice –Structure of Crystal (Simple Cubic, Body Centered Cubic, Face Centered Cubic and Hexagonal Close Packed structure)- Other cubic structures (Diamond structure, Zinc blende structure, Sodium chloride structure and Caesium Chloride structure) -Directions, Planes and Miller indices.

**UNIT II: CRYSTALLOGRAPHY AND CRYSTAL IMPERFECTIONS**

X ray Diffraction - Bragg's law – Bragg's X-Ray Spectrometer- Experimental method in X-ray diffraction – Powder Crystal method-Rotating crystal method - point defects – line, surface and volume defects - Effects of Crystal imperfections.

**UNIT III: DIELECTRIC PROPERTIES**

Basic definitions - different types of electric polarization - frequency and temperature effects on polarization - dielectric loss – Local field – Clausius - Mosotti relation - determination of dielectric constant - dielectric breakdown - properties of dielectric materials- Ferroelectric materials.

**UNIT IV: MAGNETIC PROPERTIES**

Basic definitions - types of magnetic materials – Langevin's theory of diamagnetism - Langevin's theory of paramagnetism - Weiss theory of paramagnetism - quantum theory of ferromagnetism – Curie-Weiss law- Ferromagnetic domains- Explanations of hysteresis- Antiferromagnetic materials- ferromagnetic materials.

**UNIT V SUPERCONDUCTIVITY:**

Properties of Super conductors (Critical Temperature, Critical magnetic field, Isotope effect, Meissner effect) - Type I and type II Superconductors - BCS theory - London's Equation and Penetration Depth- a c and d c Josephson effect- super conducting materials- Applications of super conducting materials.

**Books for Study:**

1. Solid State Physics, S.O.Pillai, New Age International publishers Pvt Ltd., (7<sup>th</sup> ed., 2015)
2. Solid State Physics, K.Elangovan, S.Viswanathan publishers Pvt. Ltd., (1<sup>st</sup> ed., 2007).

**Books for Reference:**

1. Introduction to Solid State Physics, Charles Kittel, Wiley India Pvt. Ltd., (8<sup>th</sup> ed., 2013)
2. Solid State Physics, M.A. Wahab, 2011, Narosa Publications, (3<sup>rd</sup> ed., 2015)

<b>VI SEMESTER</b>		
<b>DSC 12</b>	<b>PROJECT</b>	<b>18UCPH63</b>
<b>Hrs/Week: 6</b>	<b>Hrs/Sem: 6x15=90</b>	<b>Credit: 6</b>

**Objectives:**

- To identify the potential areas of research in his/her field.
- To collect literatures from various sources including the internet, analyze them.
- To read and write originally, meaningfully and usefully.

**GUIDELINES:**

1. The project may be done individually or in groups not exceeding five per group.
2. The minimum length of the project should be 30 pages in A4 size.
3. Marks for the project report will be 100 divided as 60% for the project note and 40% for viva – voce examination.

**Evaluation scheme:**

The project will be evaluated by both Internal and External Examiners. Each Examiner will evaluate for 100 marks. The allocation of marks for project is as follows:

<b>Project</b>	<b>Internal Examiner</b>	<b>External Examiner</b>
Word of title	5	5
Objectives / Formulation including Hypothesis	5	5
Review of literature	10	10
Relevance of project to social needs	5	5
Methodology / Technique / Procedure adopted	20	20
Summary / Findings / Summation	5	5
Works cited / Annexure / Footnotes	10	10
<b>Total</b>	<b>60</b>	<b>60</b>

VI SEMESTER			
<b>DSE 4A</b>	<b>COMMUNICATION ELECTRONICS</b>	<b>18UEPH6A</b>	
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4 x 15 = 60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit: 4</b>

**Objectives:**

- To acquire the knowledge about the different types of modulation like AM, FM and PM and its applications.
- To understand the principles and the applications of digital, broadband and fibre optic communications.

**UNIT I Radio communication system**

Introduction to communication system – Need for modulation–Signal to Noise ratio – amplitude modulation (AM) – its frequency spectrum – AM transmitter –AM Superheterodyne receiver – Frequency Modulation – its frequency spectrum – FM transmitter – comparison of AM and FM.

**UNIT II Pulse Communication**

Introduction – types of pulse modulation – Pulse Amplitude Modulation – Pulse Width Modulation – Generation and detection of Pulse Position Modulation – Pulse Code Modulation – frequency division multiplexing – time division multiplexing – telegraphy – Telemetry.

**UNIT III Digital Communication**

Principle of digital communication –characteristics of data transmission circuits – digital codes – need and functioning of modem – Network organization – types of networks – network protocol – E-mail – Internet

**UNIT IV Broad band Communication**

Microwave links – principle and design – repeaters –Long Haul systems – submarine cables– satellite communication – principle & characteristics– earth station – satellite construction – radar system – Radar performance factors – Doppler effect and its application to Radar – CW radar system – pulsed radar system.

**UNIT V Optical Communication**

Optical fibre – Acceptance angle – Numerical aperture – characteristics of optical fibre and advantages – fibre cables & losses – Fiber optic components and systems – source (Laser diode) – detector (PIN diode & APD) –Optical link – fibre testing – fusion splicing – mechanical splicing – optical connectors – optical communication receiver.

**Books for Study:**

1. Principles of Communication - K.S. Srinivasan — Anuradha Publications (Revised edition, 2008).
2. Communication Electronics – Louis E. Frenzel, TMH, New Delhi (4<sup>th</sup> ed.).

**Books for Reference:**

1. Principles of communication systems – Taub & Schilling, TMH, New Delhi.
2. Principle of communication – K. Murali Babu & K. VinothBabu, Lakshmi Publications.
3. Modern Electronic Communication – Jeffrey S. Beasley, Gary M. Miller, PHI Pvt. Ltd., New Delhi.
4. Optical Fibre communication – Gerd Keisser.3<sup>rd</sup> edition, McGraw Hill, Singapore.

VI SEMESTER			
<b>DSE 4B</b>	<b>NUMERICAL METHODS</b>	<b>18UEPH6B</b>	
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4x15=60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit: 4</b>

**Objectives:**

To understand various approximation methods to find solution to problems which do not have exact solutions.

**UNIT I Solutions of Numerical Algebraic and Transcendental equations**

Bisection method – Successive approximation method – Regular falsi method – Newton Raphson method.

**Unit II – Solutions of simultaneous linear equations**

Gauss elimination method – Gauss Jordan modification – Gauss Jacobi method – Gauss seidal method.

**UNIT III – Interpolation**

Newton's forward interpolation method – Newton's backward interpolation method – Interpolation method for unequal intervals – Lagrange's method – Inverse interpolation.

**UNIT IV – Numerical Differentiations and Integration**

Newton Gregory's forward interpolation formula for derivatives – Newton Gregory's Backward interpolation formula for derivatives – Trapezoidal rule – Simpson's 1/3 rule.

**UNIT V – Numerical solutions of differential equations**

Taylor series method – Runge kutta second order and fourth order method – predictor and corrector method – Milne's predictor – corrector method.

**Books for Study:**

1. Numerical methods in science and engineering – Dr. M.K. Venketaraman, The National Publishing Company, Chennai, (1999)

**Books for Reference:**

1. Introductory methods of numerical analysis- S.S. Sastry, Prentice Hall of India, New Delhi (2000).
2. Numerical methods for scientific and engineering computation – M.K. Jain, S.R.K. Iyenkar, R.K. Jain
3. Numerical Mathematical analysis, J.B. Scarborough,

VI SEMESTER		
<b>CP 8</b>	<b>PHYSICS PRACTICALS - VII</b>	<b>18UCPH6P1</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4x15=60</b>	<b>Credit: 2</b>

1. Determination of Hartmann's constants.
2. *Determination of refractive index –  $i - i'$  curve.*
3. Elliptical fringes- Young's Modulus.
4. To determine the wavelength of Laser light using Diffraction of Single Slit.
5. BG- Determination of a high resistance by Leakage Method
6. BG- To determine the Self Inductance of a Coil by Rayleigh's Method.
7. To verify the Thevenin's and Norton's theorem.
8. B-H hysteresis-CRO.
9. Desauty bridge - Determination of capacitance.
10. To determine the electrochemical equivalent of copper.

**Books for Reference:**

1. Ouseph, Srinivasan & Vijayendran, Practical Physics
2. P. R. Sasi Kumar, Practical Physics –, PHI.
3. S. P. Singh, Advanced Practical Physics, Pragathi Prakasam.
4. Practical Physics – St. Joseph College, Trichy.
5. A Textbook of Practical Physics, Indu Prakash and Ramakrishna, 11<sup>th</sup> ed.

VI SEMESTER		
<b>CP 8</b>	<b>PHYSICS PRACTICALS- VIII</b>	<b>18UCPH6P2</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4x15=60</b>	<b>Credit: 2</b>

- 1 Dual power supply – IC regulated
- 2 Characteristics of Op-amp
- 3 To study the characteristics of Light Emitting Diode
- 4 To study the characteristics of Light Dependent Resistance.
- 5 To construct and study the response of a Single stage amplifier –with feedback
- 6 Hartley oscillator
- 7 To design a monostable multivibrator of given specifications using 555 Timer.
- 8 Wien's bridge oscillator - Op – amp
- 9 Differentiator & integrator using Op – amp
- 10 To verify and design AND, OR, NOT and XOR gates using NOR gate

**Books for Reference:**

- 1 Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 1994, Mc-Graw Hill.
- 2 Electronics: Fundamentals and Applications, J.D. Ryder, 2004, Prentice Hall.
- 3 OP-Amps and Linear Integrated Circuit, R. A. Gayakwad, 4th edition, 2000, Prentice Hall.

VI SEMESTER			
SEC II	Energy Physics		18USPH61
Hrs/Week: 2	Hrs/Sem: 2x15= 30	Hrs./ UNIT: 6	Credit: 2

**Objectives:**

To provide an understanding of the present energy crisis and various available energy sources.

**UNIT I Conventional Energy Sources:**

World's reserve of commercial energy sources and their availability - various forms of energy - renewable and conventional energy systems - comparison - coal, oil and natural gas - availability - statistical details - applications - merits and demerits.

**UNIT II Non-Conventional Energy Sources:**

Renewable energy sources - solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar ponds, solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.

**UNIT III Biomass energy:**

Biomass energy - classification - photosynthesis - biomass conversion process - Kachara gas plants – Materials used for bio gas generation - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source

**UNIT IV Geothermal energy:**

Geothermal energy – Estimate of Geothermal power –Nature of Geothermal fields- Geo thermal sources-Arrangements for hybrid plants- Applications of Geo thermal energy.

**UNIT V Wind energy and ocean energy:**

The nature of the wind – site selection consideration –Basic components of WECS-Advantage and disadvantages of WECS-Application of wind energy- ocean thermal energy conversion (OTEC)-Methods of ocean thermal electric power generation- Bio fouling- Hybrid cycle.

**Books for Study:**

1. Non-Conventional Energy Sources, G.D. Rai, Khanna Publishers (4th Ed., 2010).
2. Energy Technology by S. Rao and Dr. B.B. Parulekar, Khanna Publishers (2015).

**Books for Reference:**

- 1.Non-conventional energy sources, B.H. Khan, McGraw Hill
- 2.Solar Energy by G.D. Rai, Ed. V, 1995.

VI SEMESTER			
SBC	Personality Development		18USPD62
Hrs/Week: 2	Hrs/Sem: 2x15= 30	Hrs./ UNIT: 6	Credit: 2

**UNIT – I**

**PERSONALITY** - Definition – Determinants – Personality Traits –Theories of Personality – Importance of Personality Development. **SELF AWARENESS** – Meaning – Benefits of Self – Awareness – Developing Self – Awareness. **SWOT** – Meaning – Importance- Application – Components.

**UNIT – II**

**SELF MONITORING** – Meaning –Advantages and Disadvantages self-monitor - Self – monitoring and job performance. **PERCEPTION**- Definition- Factor influencing perception- Perception process. **ATTITUDE** – Meaning- Formation of attitude – Types of attitude - Measurement of Attitudes. **ASSERTIVENESS** - Meaning – Assertiveness in Communication – Assertiveness Techniques.

**UNIT – III**

**TEAM BUILDING** – Meaning – Types of teams – Importance of Team building- Creating Effective Team. **LEADERSHIP** – Definition – Leadership style – Qualities of an Effective leader. **NEGOTIATION SKILLS** – Meaning – Principles of Negotiation – Types of Negotiation – The Negotiation Process. **CONFLICT MANAGEMENT** – Definition- Types of Conflict- Levels of Conflict.

**UNIT –IV**

**COMMUNICATION:** Definition – Importance of communication –Process of communication –Barriers in communication – Overcoming Communication Barriers. **EMOTIONAL INTELLIGENCE:** Meaning – Components of Emotional Intelligence- Significance of managing Emotional intelligence. **STRESS MANAGEMENT** – Meaning – Sources of Stress – Symptoms of Stress – Consequences of Stress – Managing Stress.

**UNIT – V**

**SOCIAL GRACES** – Meaning – Social Grace at Work – Acquiring Social Graces. **TABLE MANNERS** – Meaning – Table Etiquettes in Multicultural Environment- Do's and Don'ts of Table Etiquettes. **DRESS CODE** – Meaning- Dress Code for selected Occasions – Dress Code for an Interview. **GROUP DISCUSSION** – Meaning – Personality traits required for Group Discussion- Process of Group Discussion. **INTERVIEW** – Definition- Types of skills – Employer Expectations –Planning for the Interview – Interview Questions- Critical Interview Questions.

**REFERENCES:**

1. Dr.S. Narayana Rajan, Dr. B. Rajasekaran, G. Venkadasalapathi, V. Vijuresh Nayaham and Herald M.Dhas, **Personality Development**, Publication Division, Manonmaniam Sundaranar University, Tirunelveli
2. Stephan P.Robbins, **Organisational Behaviour**, Tenth Edition, Prentice Hall of India Private Limited, New Delhi,2008
3. Jit S. Chandan, **Oragnisational Behaviour**, Third Edition, Vikas Publishing House Private Limited, 2008
4. Dr. K.K. Ramachandran and Dr. K.K. Karthick, **From Campus to Corporate**, Macmillan Publishers India Limited, New Delhi, 2010.

<b>PART III – ALLIED II</b>			
<b>Allied Physics offered by Physics Department to B.Sc. Mathematics and B.Sc. Chemistry Students</b>			
<b>III SEMESTER</b>			
<b>AII-1</b>	<b>ALLIED PHYSICS – I</b>		<b>18UAPH31</b>
<b>Hrs/Week: 4</b>	<b>Hrs/Sem: 4x15= 60</b>	<b>Hrs./ UNIT: 12</b>	<b>Credit: 3</b>

**Objectives:**

- To acquire an in-depth knowledge of Elasticity.
- To understand the basic phenomena of light
- To inculcate the knowledge about heat transfer phenomena.

**UNIT I Elasticity**

Elastic moduli – Poisson's ratio – relation between elastic constants – Expression for bending moment – cantilever – expression for depression – experiment to find young's modulus (uniform bending) – expression for elevation – experiment to find young's modulus using microscope (non uniform bending) – expression for depression – experiment to find Young's modulus using scale and telescope.

**UNIT II Interference and Diffraction**

Young's experiment – Condition for interference – Additional phase difference due to dissimilar reflections – Colours of thin film – Air wedge – Thickness of wire – Fresnel and Fraunhofer diffraction – Plane transmission grating – Theory and experiment to find wavelength by normal incidence method. Distinction between interference and diffraction bands.

**UNIT III Polarisation**

Double refraction – Nicol prism – Brewster's law – Production and analysis of plane, circularly and elliptically polarized light, half wave and quarter wave plate – Optical activity – specific rotation (definition)

**UNIT IV Transport Phenomena**

Mean free path – expression for mean free path (Zeroth order approximation) Transport phenomena – Viscosity, thermal conductivity, diffusion

**UNIT V Transfer of Heat**

Conduction – Coefficient of thermal conductivity – definition – Thermal conductivity of a bad conductor – Lee's Disc experiment – Convection – Newton's law of cooling – determination of specific heat capacity of liquid – Radiation – Stefan's law – Planck law.

**Books for Study and Reference:**

1. Properties of matter – Brijlal & Subrahmanyam – S. Chand & Co. – New Delhi.
2. College Physics – Volume 1 – A.B.Gupta – Books and Allied (P) Ltd. – Kolkata – 700010.
3. Heat and Thermodynamics, Brijlal & Subramaniyam S. Chand & Co. – New Delhi.
4. A Textbook of Optics, Brijlal, Subrahmanyam & M.N. Avathanu – S. Chand & Co. – New Delhi.



PART III – ALLIED II			
Allied Physics offered by Physics Department to B.Sc. Mathematics and B.Sc. Chemistry Students			
IV SEMESTER			
AII-2	ALLIED PHYSICS – II		18UAPH41
Hrs/Week: 4	Hrs/Sem: 4x15= 60	Hrs./ UNIT: 12	Credit:3

**Objectives:**

- To study the wave nature of matter and to understand the nucleus and its properties.
- To give an insight to the electric and magnetic phenomena.
- To study the characteristics and to working principles of diodes and transistors.
- To understand the logic gates and boolean algebra
- To inculcate the knowledge about heat transfer phenomena

**UNIT I Relativity and Wave Mechanics**

Frame of reference – Galilean transformation – Postulates – Lorentz transformation – de Broglie's theory of matter waves – Expression for de Broglie wavelength – Davison and Germer experiment

**UNIT II Nuclear Physics**

Nuclear structure – Properties of nucleus – Packing fraction – Binding energy – BE/A curve – Nuclear forces – Nuclear stability – Liquid drop model.

**UNIT III Electricity & Electromagnetism**

Charge – Current – Potential difference – Resistance & Resistivity – Ohm's law – Kirchoff's law – Potentiometer – Principles – Calibration of Voltmeter – Capacitor – LCR series circuit – LCR parallel circuit – Self induction – self inductance of toroidal solenoid – mutual inductance between coils.

**UNIT IV Basic Electronics**

Semiconductor diode – Diode Characteristics – Zener diode characteristics – Regulation with Zener diode – Bridge rectifier – Biasing of transistor – RC Coupled Amplifier.

**UNIT V Digital Electronics**

Basic logic gates – NOR, NAND gates – EX – OR gate – Boolean equations and logic circuit from table – NOR and NAND gates as universal building blocks – Binary adder – Half adder – Full adder

**Books for Study and Reference:**

1. Modern Physics – R. Murugesan and Kiruthiga Sivaprasath – (15<sup>th</sup> edition) – S. Chand & Co., New Delhi.
2. Electricity & Magnetism – R. Murugesan. 8<sup>th</sup> edition – S. Chand & Co., New Delhi.
3. Introduction to Integrated Electronics, Digital and Analog – V. Vijayendran – S. Viswanathan Pvt. Ltd., Chennai.

<b>III SEMESTER</b>		
<b>AII-P1</b>	<b>Allied Physics Practicals-I</b>	<b>18UAPH3P1</b>
<b>Hrs/Week: 2</b>	<b>Hrs/Sem: 2x15=30</b>	<b>Credit: 1</b>

1. Young's modulus – Uniform bending (Pin and Microscope)
2. Young's modulus – Non-Uniform bending (scale and Telescope)
3. Verification of Kirchoff's law.
4. Verification of Newton's law of cooling
5. Spectrometer Grating – Oblique incidence
6. LCR series circuit
7. Air wedge – Thickness of wire
8. Calibration of Voltmeter using potentiometer
9. Characteristics of Zener diode
10. Basic logic gates OR, NOT & AND

**Books for Reference:**

1. Practical Physics - Ouseph, Srinivasan & Vijayendran,
2. Practical Physics – P. R. Sasi Kumar, PHI.
3. Advanced Practical Physics - S. P. Singh, Pragathi Prakasam.
4. Practical Physics – St. Joseph College, Trichy.

<b>IV SEMESTER</b>		
<b>AII-P2</b>	<b>Allied Physics Practicals-II</b>	<b>18UAPH4P1</b>
<b>Hrs/Week: 2</b>	<b>Hrs/Sem: 2x15=30</b>	<b>Credit: 1</b>

1. Young's modulus – Cantilever – depression
2. Lee's disc – Thermal Conductivity
3. Transistor Characteristics (CE mode)
4. Viscosity- capillary flow
5. Spectrometer Grating – Normal incidence
6. Newton's rings – Refractive Index of lens
7. LCR parallel circuit
8. NAND as universal gate
9. NOR as universal gate
10. Calibration of low range Ammeter- Potentiometer

**Books for Reference:**

1. Practical Physics - Ouseph, Srinivasan & Vijayendran,
2. Practical Physics – P. R. Sasi Kumar, PHI.
3. Advanced Practical Physics - S. P. Singh, Pragathi Prakasam.
4. Practical Physics – St. Joseph College, Trichy.

<b>SCHEME OF EXAMINATIONS UNDER CBCS (2018 - 2021)</b>
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The medium of instruction in all UG and PG courses is English, and students must write the CIA Tests and Semester Examinations in English.

**DISTRIBUTION OF MARKS FOR CIA AND SEMESTER EXAMINATIONS  
UNDERGRADUATE, CERTIFICATE & DIPLOMA COURSES**

SUBJECT	TOTAL MARKS	CIA TEST	SEMESTER EXAMINATION	PASSING MINIMUM		
				CIA TEST	SEM. EXAM.	OVER ALL
<b>Theory</b>	100	25	75	Nil	30	40
<b>Practical (4 hrs)</b>	100	40	60	Nil	24	40
<b>Practical (2 hrs)</b>	50	20	30	Nil	12	20
<b>Project</b>	100	Nil	Report - 60 marks Viva Voce - 40 marks	Nil	Nil	40

**DIVISION OF MARKS FOR CIA TEST**

SUBJECT	MARKS	ASSIGNMENT FOR UG / ASSIGNMENT OR SEMINAR FOR PG	RECORD NOTE	TOTAL MARKS
<b>Theory</b>	20	5	--	<b>25</b>
<b>Practical (4 hrs)</b>	30	--	10	<b>40</b>
<b>Practical (2 hrs)</b>	15	--	5	<b>20</b>

1. The duration of each CIA Test is ONE hour and the Semester Examination is THREE hours.
2. Three CIA tests of 20 marks each will be conducted and the average marks of the best two tests out of the three tests will be taken.
3. The I test will be based on the first 1.5 units of the syllabus, the II test will be based on the next 1.5 units of the syllabus and the III test will be based on the next 1.5 units of the syllabus.
4. Two assignments for Undergraduate, Certificate, Diploma and Advanced Diploma Courses and two assignments OR two seminars for Postgraduate Courses has to be submitted.
5. The duration and the pattern of question paper for practical examination may be decided by the respective Boards of Studies. However, out of 60 marks in the semester practical examination, 10 marks may be allotted for record and 50 marks for practical.
6. Two internal practical tests of 30/15 marks each will be conducted for science students in the respective semester and the average will be taken. The record marks allotted for the above practical are 10 and 5 respectively.

**QUESTION PAPER PATTERN FOR CIA TEST (THEORY)****Duration: 1 Hr****Maximum Marks: 20**

<b>Section</b>	<b>Question Type</b>	<b>No. of Questions &amp; Marks</b>	<b>Marks</b>
<b>A</b>	No Choice Answer should not exceed 75 words	2 Questions 2 marks each	$2 \times 2 = 4$
<b>B</b>	Internal choice (Either or type) Answer should not exceed 200 words	2 Questions 4 marks each	$2 \times 4 = 8$
<b>C</b>	Open Choice (Answer ANY ONE out of Two) Answer should not exceed 400 words	1 Question 8 marks	$1 \times 8 = 8$
<b>TOTAL</b>			<b>20 MARKS</b>

**QUESTION PAPER PATTERN FOR SEMESTER EXAMINATION (THEORY)****Duration: 3 Hrs****Maximum Marks: 75**

<b>Section</b>	<b>Question Type</b>	<b>No. of Questions &amp; Marks</b>	<b>Marks</b>
<b>A</b>	No Choice Answer should not exceed 75 words	10 Questions - 2 marks each (2 Questions from each unit)	$10 \times 2 = 20$
<b>B</b>	Internal choice (Either or type) Answer should not exceed 200 words	5 Questions with internal choice. Each carry 5 marks (Two questions from each unit)	$5 \times 5 = 25$
<b>C</b>	Open Choice (Answer ANY THREE out of FIVE) Answer should not exceed 400 words	3 Questions out of 5 - 10 marks each (1 Question from each unit)	$3 \times 10 = 30$
<b>TOTAL</b>			<b>75 MARKS</b>