B.Sc. PHYSICS

LOCF SYLLABUS 2023

Department of Physics
School of Physical Sciences
St. Joseph's College (Autonomous)
Tiruchirappalli - 620 002, Tamil Nadu, India

Vision

Forming globally competent, committed, compassionate and holistic persons, to be men and women for others, promoting a just society.

Mission

- Fostering learning environment to students of diverse background, developing their inherent skills and competencies through reflection, creation of knowledge and service.
- Nurturing comprehensive learning and best practices through innovative and value-driven pedagogy.
- Contributing significantly to Higher Education through Teaching, Learning, Research and Extension.

Programme Educational Objectives (PEOs)

- Graduates will be able to accomplish professional standards in the global environment.
- Graduates will be able to uphold integrity and human values.
- Graduates will be able to appreciate and promote pluralism and multiculturalism in working environment.

Programme Outcomes (POs)

1. Graduates will be able to comprehend the concepts learnt and apply in real life situations with analytical skills.
2. Graduates with acquired skills and enhanced knowledge will be employable/ become entrepreneurs or will pursue higher Education.
3. Graduates with acquired knowledge of modern tools communicative skills and will be able to contribute effectively as team members.
4. Graduates are able to read the signs of the time analyze and provide practical solutions.
5. Graduates imbibed with ethical values and social concern will be able to understand and appreciate social harmony, cultural diversity ensure sustainable environment.

Programme Specific Objectives (PSOs)

1. Acquired academic excellence with an aptitude for higher studies and research.
2. Gained knowledge about properties of different matter and its application for developing technology to the problems related to the society.
3. Analysed the applications to the problems in Physics through experimental and theoretical means.
4. Acquired the ability to design knowledge and demonstrate their understanding of the scientific methods and processes.
5. Apply appropriate techniques and modern tools to complex scientific activities, and develop skills in communicating Physics-related topics by learning beyond syllabus.

CONTINUOUS INTERNAL ASSESSMENT
Categorizing Outcome Assessment Levels Using Bloom's Taxonomy

Level	Cognitive Domain	Description
K1	Remember	It is the ability to remember the previously learned concepts or ideas.
K2	Understand	The learner explains concepts or ideas.
K3	Apply	The learner uses existing knowledge in new contexts.
K4	Analyse	The learner is expected to draw relations among ideas and to compare and contrast.
K5	Evaluate	The learner makes judgements based on sound analysis.
K6	Create	The learner creates something unique or original.

Question Paper Blueprint for Mid and End Semester Tests

<table>
<tr><td colspan="3">Duration: 2 Hours</td><td colspan="6">Maximum Marks: 60</td></tr>
<tr><td colspan="2" rowspan="2">Section</td><td colspan="6">K level*</td><td rowspan="2">Marks</td></tr>
<tr><td>K1</td><td>K2</td><td>K3</td><td>K4</td><td>K5</td><td>K6</td></tr>
<tr><td colspan="2">A (no choice)</td><td>7</td><td></td><td></td><td></td><td></td><td></td><td>7 × 1 = 7</td></tr>
<tr><td colspan="2">B (no choice)</td><td></td><td>5</td><td></td><td></td><td></td><td></td><td>5 × 3 = 15</td></tr>
<tr><td colspan="2">C (either… or type)</td><td></td><td></td><td>3</td><td></td><td></td><td></td><td>3 × 6 = 18</td></tr>
<tr><td rowspan="4">D (2 out of 3)</td><td>Courses with K4 as the highest cognitive level</td><td></td><td></td><td></td><td>2</td><td></td><td></td><td rowspan="4">2 × 10 = 20</td></tr>
<tr><td>Courses with K5 as the highest cognitive level wherein one question each on K4 and K5 is compulsory.
(Note:K4 has two questions whereas, K5 has no choice.)</td><td></td><td></td><td></td><td>1</td><td>1</td><td></td></tr>
<tr><td rowspan="2">Courses with K6 as the highest cognitive level wherein one question each on K5 and K6 is compulsory.
(Note: Mid Sem: K4 has two questions whereas, K5 has no choice; End sem: K5 has two questions whereas, K6 has no choice)</td><td></td><td></td><td></td><td colspan="2">Mid Sem</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td colspan="2">End Sem</td></tr>
<tr><td colspan="6">Total</td><td>60</td></tr>
</table>

** K4 and K5 levels will be assessed in the Mid semester test whereas K5 and K6 levels will be assessed in the End semester test.*

Question Paper Blueprint for Mid and End Semester Tests *(For quantitative courses only)*

Duration: 2 Hours						**Maximum Marks: 60**
Section	**K level**					**Marks**
	K1	**K2**	**K3**	**K4**	**K5**	
A *(no choice)*	9					9 × 1 = 9
B *(either… or type)*		2	1			3 × 5 = 15
C *(2 out of 3)*				1	1*	2 × 18 = 36
					Total	**60**

** K5 compulsory*

SEMESTER EXAMINATION
Question Paper Blueprint for Semester Examination

Duration: 3 Hours								**Maximum Marks: 100**
Section		**K level**						**Marks**
		K1	**K2**	**K3**	**K4**	**K5**	**K6**	
A *(no choice, two questions from each unit)*		10						10 × 1 = 10
B *(no choice, two questions from each unit)*			10					10 × 3 = 30
C *(either… or type, one question from each unit)*				5				5 × 6 = 30
D *(3 out of 5, one question from each unit)*	*Courses with K4 as the highest cognitive level*				3			3 × 10 = 30
	Courses with K5 as the highest cognitive level wherein two K4 questions and one K5 question are compulsory. (Note: Three questions on K4 and two questions on K5)				2	1		
	Courses with K6 as the highest cognitive level wherein one question each on K4, K5, and K6 is compulsory. (Note: Two questions each on K4 and K5 and one question on K6)				1	1	1	
							Total	**100**

Question Paper Blueprint for Semester Examination *(For quantitative courses only)*

Section	Marks	K level
A	10 × 1 = 10	K1
B	5 × 6 = 30 *(either…or)*	K2 *(Q. No. 11 & 12)* K3 *(Q. No. 13, 14 & 15)*
C	4 × 15 = 60 *(4 out of 5)*	K4 *(Q. No. 16, 17 & 18)* K5 *(Q. No. 19 & 20)*
Total Marks: 100		

Evaluation Pattern for Part IV One/Two Credit Courses

Title of the Course	CIA	Semester Examination	Total Marks
Internship	100		**100**
UG Skill Enhancement Course (Non Major Elective) Foundation Course **PG** Ability Enhancement Course	20 + 10 + 20 = 50	50 *(External member from the Department)*	**100**
Value Education	50	50 *(CoE)*	**100**

B.Sc. PHYSICS								
PROGRAMME PATTERN								
Course Details						Scheme of Exams		
Sem	Part	Course Code	Title of the Course	Hours	Credits	CIA	SE	Final
1	1	23UTA11GL01A	General Tamil - 1	5	3	100	100	100
		23UFR11GL01	French - 1					
		23UHI11GL01	Hindi - 1					
		23USA11GL01	Sanskrit - 1					
	2	23UEN12GE01	General English - 1	5	3	100	100	100
	3	23UPH13CC01	**Core Course - 1:** Properties of Matter and Acoustics	5	4	100	100	100
		23UPH13CP01	**Core Practical - 1:** Properties of Matter and Acoustics	3	2	100	100	100
		23UPH13AC01	**Allied Course - 1:** Allied Mathematics for Physics - 1	6	4	100	100	100
	4	23UPH14FC01	**Foundation Course:** Introductory Physics	2	1	100	-	100
		23UPH14SE01A	**Skill Enhancement Course - 1: (Non Major Elective)** Physics for Everyday Life	2	1	100	-	100
		23UPH14SE01B	**Skill Enhancement Course - 1: (Non Major Elective)** Home Electrical Installation					
		23UHE14VE01	**Value Education - 1:** Essentials of Humanity*	2	1	50	50	50
		23UEN14AE01	**Ability Enhancement Compulsory Course - 1:** Communicative English	(6)	3	100	-	100
			Total	**30**	**22**			
2	1	23UTA21GL02	General Tamil - 2	4	3	100	100	100
		23UFR21GL02	French - 2					
		23UHI21GL02	Hindi - 2					
		23USA21GL02	Sanskrit - 2					
	2	23UEN22GE02	General English - 2	5	3	100	100	100
	3	23UPH23CC02	**Core Course - 2:** Mechanics	5	5	100	100	100
		23UPH23CP02	**Core Practical - 2:** Physics Practical - 2	3	2	100	100	100
		23UPH23WS01	Basic Workshop Practice	3	1	100	-	100
		23UPH23AC02	**Allied Course - 2:** Allied Mathematics for Physics - 2	6	4	100	100	100
	4	23UHE24AE01	**Ability Enhancement Compulsory Course - 2:** Environmental Studies*	2	1	50	50	50
		23UHE 24VE02	**Value Education - 2:** Fundamental of Human Rights*	2	1	50	50	50
		-	Extra Credit Courses (MOOC/Certificate Courses) - 1	-	(3)			
			Total	**30**	**20(3)**			
3	1	23UTA31GL03	General Tamil - 3	4	3	100	100	100
		23UFR31GL03	French - 3					
		23UHI31GL03	Hindi - 3					
		23USA31GL03	Sanskrit - 3					
	2	23UEN32GE03	General English - 3	5	3	100	100	100
	3	23 UPH33CC03	**Core Course - 3:** Mathematical Physics - 1	5	5	100	100	100
		23 UPH33CC04	**Core Course - 4:** Electromagnetism	5	5	100	100	100
		@	**Core Practical - 3:** Physics Practical - 3	3	-			
		23UPH33AO01A	**Allied Optional - 1:** Allied Chemistry - 1	4	4	100	100	100
		23UPH33AO01B	**Allied Optional - 1:** Allied Computer Science - 1					
		@	**Allied Optional Practical:** Allied Chemistry Practical	2	-	-	-	-
		@	**Allied Optional Practical:** Allied Computer Science Practical					
	4	23UHE 34VE03A	**Value Education - 3:** Social Ethics - 1*	2	1	50	50	50
		23UHE 34VE03B	**Value Education - 3:** Religious Doctrine - 1*					
		-	Extra Credit Courses (MOOC/Certificate Courses) - 2	-	(3)			
			Total	**30**	**21 (3)**			
4	1	23UTA41GL04B	General Tamil - 4 அறிவியல் தமிழ் (Scientific Tamil)	4	3	100	100	100
		23UFR41GL04	French - 4					
		23UHI41GL04	Hindi - 4					
		23USA41GL04	Sanskrit - 4					
	2	23UEN42GE04	General English - 4	5	3	100	100	100
	3	23UPH43CC05	**Core Course - 5:** Mathematical Physics - 2	5	4	100	100	100
		23UPH43CC06	**Core Course - 6:** Sound, Thermal and Statistical Physics	5	4	100	100	100
		23UPH43CP03	**Core Practical - 3:** Physics Practical - 3	3	2	100	100	100
		23UPH43AO02A	**Allied Optional:** Allied Chemistry - 2	4	3	100	100	100
		23UPH43AO02B	**Allied Optional:** Allied Computer Science - 2					
		23UPH43OP01A	**Allied Optional Practical:** Allied Chemistry Practical	2	1	100	100	100
		23UCS43OP01B	**Allied Optional Practical:** Allied Computer Science Practical					

	4	23UHE44VE04A	**Value Education - 4:** Social Ethics - 2*	2	1	50	50	50
		23UHE44VE04B	**Value Education - 4:** Religious Doctrine - 2*					
		-	Extra Credit Courses (MOOC/Certificate Courses) - 3		(3)			
			Total	30	**21(3)**			
5	3	23UPH 53CC07	**Core Course - 7:** Optics	4	4	100	100	100
		23UPH53CC08	**Core Course - 8:** Concepts of Modern Physics	4	4	100	100	100
		23UPH53CP04	**Core Practical - 4:** Physics Practical - 4	6	2	100	100	100
		23UPH53ES01A	**Discipline Specific Elective - 1:** Analog and Digital Electronics	5	3	100	100	100
		23UPH53ES01B	**Discipline Specific Elective - 1:** Design of Analog and Digital Circuits					
		23UPH53ES02A	**Discipline Specific Elective - 2:** Classical Mechanics	5	3	100	100	100
		23UPH53ES02B	**Discipline Specific Elective - 2:** Solid State Physics					
		23UPH53IS01	Internship	-	1	100	-	100
		23UPH53SP01	**Self-paced Learning:** Astronomy*	-	2	50	50	50
	4	23UPH54EG01A	**Generic Elective - 1:** Everyday Physics	4	2	100	100	100
		23UPH54EG01B	**Generic Elective - 1:** Renewable Energy Physics					
		23USS54SE01	**Skill Enhance Course - 2:** Soft Skills	2	1	100	-	100
		-	Extra Credit Courses (MOOC/Certificate Courses) - 4	-	(3)			
			Total	**30**	**22(3)**			
6	3	23UPH63CC09	**Core Course - 9:** Quantum Mechanics	4	4	100	100	100
		23UPH63CC10	**Core Course - 10:** Atomic, Nuclear and Particle Physics	4	4	100	100	100
		23UPH63CP05	**Core Practical - 5:** Physics Practical - 5	6	2	100	100	100
		23UPH63ES03A	**Discipline Specific Elective - 3:** Statistical Mechanics	5	3	100	100	100
		23UPH63ES03B	**Discipline Specific Elective - 3:** Spectroscopy and Laser					
		23UPH63ES04A	**Discipline Specific Elective - 4:** Embedded System and Microcontroller	5	3	100	100	100
		23UPH63ES04B	**Discipline Specific Elective - 4:** Sensor, Transducers and IoT					
		23UPH63PW01	Project Work and Viva Voce	-	2	100	100	100
		23UPH63CE01	Comprehensive Examination*	-	2	50	50	50
	4	23UPH64EG02A	**Generic Elective - 2:** Laser Technology and its Applications	4	2	100	100	100
		23UPH64EG02B	**Generic Elective - 2:** Physics of Earth					
		23UPH64SE02A	**Skill Enhance Course - 3: (WS):** Radiation Physics and Safety	2	1	100	-	100
		23UPH64SE02B	**Skill Enhance Course - 3: (WS):** Non-Destructive Testing					
		-	Extra Credit Courses (MOOC/Certificate Courses) - 5	-	(3)			
			Total	**30**	**23(3)**			
2 - 5	5	23UCW65OR01	Outreach Programme (SHEPHERD)		4			
1 - 6			**Total (3 years)**	**180**	**133**			

@ - year end practical

N.B. In the places of * Departments have freedom to distribute this hours for Theory and Practical courses.

*- for grade calculation 50 marks are converted into 100 in the mark statements

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UTA11GL01A	General Tamil – 1	5	3

கற்றலின் நோக்கங்கள்
தமிழ்ச் செவ்வியல் இலக்கியங்களையும் காப்பியங்களையும் மாணவர்கள் அறிந்துகொள்ளல்
தமிழர் பேணி வளர்த்த அறம்சார் விழுமியங்களை மாணவர்கள் தம் வாழ்வில் பின்பற்றுதல்
தமிழில் பக்திஇயக்கப் பங்களிப்பையும் பகுத்தறிவுச் சிந்தனை மரபையும் உணர்தல்
மாணவர்கள் தம் எழுத்தாற்றலையும் மொழிப்புலமையையும் வளர்த்தெடுத்தல்
போட்டித்தேர்வுகளை எதிர்கொள்ளும் வகையில் இலக்கணம், இலக்கியம் கற்றல்

அலகு I: தமிழ் இலக்கிய, இலக்கண வரலாறு அறிமுகம் (15 மணி நேரம்)

1. இலக்கணம் :

அ. தொல்காப்பியம், இறையனார் களவியல் உரை , நம்பியகப் பொருள், புறப்பொருள் வெண்பா மாலை, நன்னூல், தண்டியலங்காரம், யாப்பருங்கலக்காரிகை- நூல்கள்

ஆ. மொழிப் பயிற்சி- ஒற்றுப்பிழை தவிர்த்தல்

- வல்லினம் மிகும் இடங்கள்
- வல்லினம் மிகா இடங்கள்
- ஈரொற்று வரும் இடங்கள்
- ஒரு, ஓர் வரும் இடங்கள்
- அது, அஃது வரும் இடங்கள்
- தான், தாம் வரும் இடங்கள்

பயிற்சி : வல்லினம் மிகும் இடங்கள், மிகா இடங்கள் தவறாக வரும்வகையில் ஒரு பத்தி கொடுத்து ஒற்றுப் பிழை திருத்தி எழுதச் செய்தல்.

2. சங்க இலக்கியம் - எட்டுத்தொகை, பத்துப்பாட்டு
3. அற இலக்கியம் - பதினெண்கீழ்கணக்கு நூல்கள்
4. காப்பிய இலக்கியம் - ஐம்பெருங் காப்பியங்கள், ஐஞ்சிறு காப்பியங்கள், சமயக் காப்பியங்கள்
5. பக்தி இலக்கியமும் (பன்னிரு திருமுறைகள், நாலாயிர திவ்வியப் பிரபந்தம் -- பகுத்தறிவு இலக்கியமும் (சித்தர் இலக்கியங்கள், புலவர் குழந்தையின் இராவண காவியம்)

அலகு II: சங்க இலக்கியம் (15 மணி நேரம்)

எட்டுத்தொகை:

6. நற்றிணை-முதல் பாடல் -நின்ற சொல்லர்
7. குறுந்தொகை 3 ஆம் பாடல் -நிலத்தினும் பெரிதே
8. ஐங்குறுநூறு –நெல் பல பொலிக! பொன் பெரிது சிறக்க!' (முதல் பாடல்)-வேட்கைப் பத்து
9. கலித்தொகை- 51 - சுடர்த்தொடீஇக் கேளாய் -குறிஞ்சிக் கலி
10. புறநானூறு -189 தெண்கடல் வளாகம் பொதுமையின்றி, நாடா கொன்றோ -187

பத்துப்பாட்டு:

11. முல்லைப்பாட்டு (முழுவதும்)

அலகு III: அற இலக்கியம் **(15 மணி நேரம்)**

12. திருக்குறள் -அறன் வலியுறுத்தல் அதிகாரம்
13. நாலடியார்-பாடல்: 131 (குஞ்சியழகும்)
14. நான்மணிக்கடிகை-நிலத்துக்கு அணியென்ப
15. பழமொழி நானூறு- தம் நடை நோக்கார்
16. இனியவை நாற்பது- 37. இளமையை மூப்பு என்று

அலகு IV: காப்பிய இலக்கியம் **(15 மணி நேரம்)**

17. சிலப்பதிகாரம் – வழக்குரைகாதை
18. மணிமேகலை- பாத்திரம் பெற்ற காதை
19. பெரியபுராணம் - பூசலார் நாயனார்புராணம்
20. கம்பராமாயணம்- குகப் படலம்
21. சீறாப்புராணம் – மானுக்குப் பிணை நின்ற படலம்
22. இயேசு காவியம் -ஊதாரிப்பிள்ளை

அலகு V: பக்தி இலக்கியமும், பகுத்தறிவு இலக்கியமும் **(15 மணி நேரம்)**

23. பக்தி இலக்கியம்:

- திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியல்லேம் எனத் தொடங்கும் பாடல் மட்டும்
- மாணிக்கவாசகர் திருவாசகம் - நமச்சிவாய வாஅழ்க நாதன்தாள் வாழ்க முதல் சிரம்குவிவார் ஓங்குவிக்கும் சீரோன் கழல் வெல்க வரை
- பொய்கையாழ்வார்-வையந் தகளியா வார்கடலே
- பூதத்தாழ்வார்-அன்பே தகளியா
- பேயாழ்வார்-திருக்கண்டேன் பொன்மேனி கண்டேன்
- ஆண்டாள் – திருப்பாவை மார்கழித் திங்கள் (முதல் பாடல்)

24. பகுத்தறிவு இலக்கியம் :

- திருமூலர் – திருமந்திரம் (270,271, 274, 275 285)
- பட்டினத்தார் -திருவிடை மருதூர் (காடே திரிந்து – எனத் தொடங்கும் பாடல் பா.எண்.279, 280)
- கடுவெளி சித்தர் - பாபஞ்செய் யாதிரு மனமே (பாடல் முழுவதும்)
- இராவண காவியம் – தாய்மொழிப் படலம் - 18. (ஏடுகை யில்லா ரில்லை முதல் - 22. செந்தமிழ் வளர்த்தார் வரை)

பாடநூல்

பொதுத்தமிழ்-1. (தமிழ் இலக்கிய வரலாறு-1), தமிழாய்வுத்துறை, தூய வளனார் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி, 2023

பார்வை நூல்கள்

1. வரதராசன்.மு. (2021) தமிழ் இலக்கிய வரலாறு, சாகித்ய அக்காதெமி.
2. விமலானந்தன். மது. ச. (2019). தமிழ் இலக்கிய வரலாறு, முல்லை நிலையம்.
3. தமிழண்ணல். (2022). புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, பாரி நிலையம்.
4. சிற்பி பாலசுப்பிரமணியன் & சேதுபதி.சொ. (2015). தமிழ் இலக்கிய வரலாறு, கவிதா வெளியீடு.
5. சிற்பி பாலசுப்ரமணியம், & பத்மநாபன். நீல. (2013). புதிய தமிழ் இலக்கிய வரலாறு (3 தொகுதிகள்), சாகித்ய அக்காதெமி.
6. பெருமாள். அ.கா. (2014). தமிழ் இலக்கிய வரலாறு, சுதர்சன் புக்ஸ்.

7. ஏசுதாசன். ப.ச. (2015). தமிழ் இலக்கிய வரலாறு, நியூ செஞ்சுரி புக் ஹவுஸ்.
8. ஸ்ரீகுமார். எஸ். (2014). தமிழ் இலக்கிய வரலாறு, ஸ்ரீசெண்பகா பதிப்பகம்.
9. பாக்கியமேரி எஃப். (2022). வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, பூவேந்தன் பதிப்பகம்.
10. சுப்புரெட்டியார்.ந., (1980). தமிழ் பயிற்றும் முறை, மணிவாசகர் நூலகம்.

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- https://www.chennailibrary.com/
- https://www.sirukathaigal.com
- https://www.tamilvirtualuniversity.org
- https://www.noolulagam.com
- https://www.katuraitamilblogspot.com

கற்பித்தல் முறை	***விரிவுரை* (Lecture), *காணொளிக் காட்சி* (Videos), *விளக்கக் காட்சி* (PPT presentation)**

Course Outcomes		
CO No.	**CO–Statements** ***இப்பாடத்தின் நிறைவில் மாணவர்கள்***	**Cognitive Levels (K –Levels)**
CO1	சங்க இலக்கியங்கள்வழி பண்டைத்தமிழரின் வாழ்வியலையும் பண்பாட்டையும் அறிந்து கொள்வர்	**K1**
CO2	அற இலக்கியங்கள், காப்பியங்கள் வெளிப்படுத்தும் அறம்சார் விழுமியங்களைத் தம் வாழ்வில் பின்பற்றுவர்	**K2**
CO3	இலக்கணக் கோட்பாடுகளை இக்கால வாழ்வியலோடு பொருத்திப் பார்ப்பர்	**K3**
CO4	மொழியறிவோடு இலக்கியங்களைப் பகுத்தாராயும் திறன் பெறுவர்	**K4**
CO5	பக்தி இயக்கங்களின் செல்வாக்கையும், தமிழரின் பகுத்தறிவு மரபையும் மதிப்பிடுவர்	**K5**

Relationship Matrix											
Semester	**Course code**		**Title of the Paper**						**Hours/Week**		**Credits**
1	**23UTA11GL01A**		**General Tamil – 1**						**5**		**3**
Course Outcomes (COs)	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO–1	**1**	**2**	**3**	**2**	**2**	**3**	**3**	**2**	**2**	**2**	**2.2**
CO–2	**2**	**2**	**3**	**2**	**2**	**2**	**3**	**2**	**3**	**2**	**2.3**
CO–3	**1**	**2**	**2**	**3**	**2**	**2**	**2**	**3**	**3**	**3**	**2.3**
CO–4	**2**	**2**	**3**	**2**	**2**	**3**	**2**	**3**	**3**	**2**	**2.4**
CO–5	**3**	**1**	**2**	**2**	**2**	**2**	**3**	**2**	**3**	**3**	**2.3**
Mean overall Score											**2.3 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UFR11GL01	French - 1	5	3

Course Objectives
To identify the basic sentence structure of the French language.
To define and describe the various grammatical tenses and use them to communicate in French.
To examine the documents presented and discuss/reply to the questions asked.
To analyze and interpret expressions used to convey the cause, the effect, the purpose and the opposition in French.
To evaluate the grammatical nature of a given passage.

Unit I **(15 hours)**

1. Salut !
2. Enchanté

Unit II **(15 hours)**

3. J'adore

Unit III **(15 hours)**

4. Tu veux bien ?

Unit IV **(15 hours)**

5. On se voit quand ?

Unit V **(15 hours)**

6. Bonne idée

Teaching Methodology	Videos, Audios, PPT presentation, Role-play, Quiz

Book for Study

Mérieux, R & Loiseau, Y. (2017). *Latitudes* -1- (A1 /A2), méthode de français, Didier, (Units 1-6 only)

Books for Reference

1. Dauda, P, Giachino, L and Baracco, C. (2020). *Generation A1*. Didier, Paris.
2. Girardet, J and Pecheur, J. (2017). *Echo A1* (2nd ed.). CLE International.
3. Fournier, I. (2011). *Talk French*. Goyal Publishers.

Websites and eLearning Sources

1. https://www.wikihow.com/Pronounce-the-Letters-of-the-French-Alphabet
2. https://francais.lingolia.com/en/grammar/tenses/le-present
3. https://www.lawlessfrench.com/grammar/articles/
4. https://www.frenchpod101.com/french-vocabulary-lists/10-lines-you-need-for-introducing- yourself
5. https://www.tolearnfrench.com/exercises/exercise-french-2/exercise-french-3295.php

Course Outcomes		
CO No.	**CO–Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K –Levels)**
CO1	recall the usage of grammatical tenses during conversations.	**K1**
CO2	apply the grammar rules in practice exercises	**K3**
CO3	explain the nuances in the usage of various grammatical tenses and their aspects	**K2**
CO4	demonstrate knowledge of various expressions used to express opinions, emotions, cause, effect, purpose and hypothesis in French	**K4**
CO5	communicate in French and summarize a given text	**K5**

Relationship Matrix											
Semester	**Course code**	**Title of the Course**								**Hours**	**Credits**
1	**21UFR11GL01**	**French - 1**								**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	1	3	1	3	3	2	3	2	2.4
CO2	2	3	3	2	1	3	3	3	3	2	2.5
CO3	1	3	2	1	2	2	2	2	3	2	2.0
CO4	3	3	3	3	3	3	3	2	3	2	2.8
CO5	3	3	3	3	2	3	3	3	3	2	2.8
Mean overall Score											**2.5 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UHI11GL01	Hindi - 1	5	3

Course Objectives
To understand the basics of the Hindi Language.
To make the students familiar with the Hindi words.
To enable the students to develop their effective communicative skills in Hindi.
To introduce the socially relevant subjects in Modern Hindu Literature.
To empower the students with globally employable soft skills.

Unit I: Buniyadi Hindi **(15 Hours)**

1. Swar
2. Vyanjan
3. Barah Khadi
4. Shabd aur
5. Vakya Rachna

Unit II: Hindi Shabdavali **(15 Hours)**

6. Rishto ke Naam
7. Gharelu padartho ke Naam

Unit III: Vyakaran **(15 Hours)**

8. Sadharan Vakya aur Sangya
9. Sarvanam
10. Visheshan
11. Kriya aadi shabdo ka prayog

Unit IV: Chote Gadyansh ka pattan **(15 Hours)**

12. Bachom ki Kahaniyam
13. Patra-Patrikao mein Prakashit Gadyansho ka Pattan

Unit V: Nibandh **(15 Hours)**

14. Sant Tiruvalluvar
15. E.V.R Thandai Periyar
16. Naari Sashakthikaran
17. Paryavaran Sanrakshan
18. Vibhinna pratiyogi parikshao ke bare mein jaankari dena
19. Pratiyogi priksha par adharit nibandho dwara bhasha ki kshamta badhane vale prashikshan kary.

Teaching Methodology	Videos, PPT, Quiz, Group Discussion, Project Work.

Books for Study

1. *Prathamic Patya Pusthak* (2022). Dakshina Bharath Hindi Prachara Sabha, Chennai,
2.Chandran, R.M. (2017). *Concise Trilingual Dictionary,* Lotus Publications, Madurai.
3. Gupth, K.M. (2020). *Hindi Vyakaran*, Anand Prakashan, Kolkatta.
4. *Madyama Patya Pusthak* (2022). Dakshina Bharath Hindi Prachara Sabha, Chennai.

Books for Reference

1. Abdul Kalam, A.P.J. (2020). *Mere sapnom ka Bharath*. Prabath Prakashan, Noida.
2. *Meri Pratham Hindi Sulekh Shabd Gyaan*, Wonder House Books, Noida.
3. Kumar, A. (2019). *Sampoorna Hindi Vyakaran our Rachana*. Lucent publisher.
4. *Adhunik Hindi Vyakaran our Rachana.* (2018). Bharati Bhavan Publishers & distributors.
5. Shukla, A.R. (2021). *Hindi Sahitya Ka Itihas.*. Prabhat Prakashan.

Websites and e-Learning Sources

1. https://learningmole.com/hindi-alphabet-letters-pronunciation-guide/
2. https://www.careerpower.in/hindi-alphabet-varnamala.html
3. https://www.youtube.com/watch?v=b0UvXnIC8qc
4. https://www.importanceoflanguages.com/learn-hindi-language-guide/
5. https://parikshapoint.com/hindi-sahitya/

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
CO1	match the sounds of Hindi letters with their written counterparts.	**K1**
CO2	infer the meaning of unknown words from the given context	**K2**
CO3	construct sentences in Hindi	**K3**
CO4	analyse stories and other passages	**K4**
CO5	interpret general essays given in competitive exams	**K5**

Relationship Matrix											
Semester	**Course code**	**Title of the Course**								**Hours**	**Credits**
1	**23UHI11GL01**	**Hindi - 1**								**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	2	1	3	3	3	1	3	2	**2.3**
CO2	2	3	2	3	1	2	3	3	3	2	**2.4**
CO3	3	2	2	2	1	3	2	3	2	3	**2.3**
CO4	3	1	2	3	2	3	2	3	3	2	**2.4**
CO5	2	3	3	2	3	2	3	3	1	3	**2.5**
Mean overall Score											**2.38 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23USA11GL01	Sanskrit- 1	5	3

Course Objectives
To help students learn the Sanskrit alphabet.
To understand Sanskrit grammar and *sabdas*.
To have an idea of the epics.
To closely understand the literary works in Sanskrit with special reference to *Pancamahakavyas*.
To understand the *Raghuvasa Mahakava* and *Kalidasa*.

Unit I: Introduction to Sanskrit **(15 Hours)**
(Alphabet, Two letter words and three letter words) Grammar
akārāntaḥpuṁliṅgaḥśabda-s - 1. बाल (*Bāla*) and
2. देव (*Deva*) *ākārāntaḥstrīliṅgaḥśabda-s* - 1. बाला (*Bālā*) and
2. लता (*Latā*) *akārāntaḥnapuṁsakaliṅgaḥśabda-s* - 1. फल (*Phala*) and 2. वन (*Vana*)

Unit II: Introduction to *Rāmāyana, Kālidāsa* and his poetic works **(15 Hours)**
Raghuvaṁśa (Canto I) Verses 1-15

Unit III: Introduction to the Works of *Bhāravi* **(15 Hours)**
Raghuvaṁśa (canto I) Verses 16-30

Unit IV: Introduction to the works of *ŚrīHarṣha* **(15 Hours)**
Raghuvaṁśa (Canto I) Verses 31-45

Unit V: Grammar **(15 Hours)**
Conjugations -*Laṭlakāra-s* – (Present tense)
(i) गच्छतत (*Gacchati*)
(ii) ततष्ठतत (*Tiṣṭhati*)
(iii) पठतत (*Paṭhati*)
(iv) नृत्यतत (*Nṛtyati*)
(v) कुप्यतत (*Kupyati*)
(vi) कथयतत (*Kathayati*) गणयतत (*Gaṇayati*)
(viii) अततत (*Asti*)
(ix) करोतत (*Karoti*)
(x) शृणोतत (*Śṛṇoti*) Indeclinables (Avyayaani) - अतप (*api*), कदा (*kadā*), च (*ca*), अद्य (*adya*), तवना (*vinā*),सह (*saha*),तत्र (*tatra*), ककमे (*kim*), यकद (*yadi*) - तर्हि (*tarhi*), यथा

(*yathā*) - तथा (*tathā*) Prefixes (*Upasargas*) - आङ् (*āṅ*), तव (*vi*), परर (*pari*), अनु (*anu*), अित (*adhi*), उत् (*ut*), प्रतत (*prati*), उप (*upa*), प्र (*pra*) तनर् (*nir*)

Teaching Methodology	Videos, PPT, demonstration.

Book for Study

Murugan, C., et al. (eds.). (2022) *Kalasala-Samskrta-Sukhabodhini-I* (For Undergraduate Foundation Course).University of Madras.

Book for Reference

Vadhyar, R. S. (2017). *Sabdha Manthari.* Vadhyar & Sons.

Websites and e-Learning Sources

1. https://www.arlingtoncenter.org/Sanskrit%20Alphabet.pdf
2. https://courses.lumenlearning.com/suny-hccc-worldcivilization/chapter/sanskrit/
3. https://www.newworldencyclopedia.org/entry/Sanskrit_literature
4. https://archive.org/details/AShortHistoryOfsanskritLiterarure
5. https://archive.org/details/raghuvamsha_with_sanjivini_edited_by_mr_kale

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
CO1	remember the usage of grammatical tenses in constructing sentences in dialogue.	**K1**
CO2	apply the rules of usage in practice exercises and spot the errors	**K2**
CO3	explain the nuances in the usage of various grammatical tenses and aspects	**K3**
CO4	demonstrate knowledge of various expressions of opinion, emotions, cause, effect, purpose, and hypothesis in Sanskrit	**K4**
CO5	communicate in Sanskrit and summarize a given text	**K5**

Relationship Matrix											
Semester	**Course code**		**Title of the Course**							**Hours**	**Credits**
1	**23USA11GL01**		**Sanskrit - 1**							**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	1	3	2	3	1	3	2	3	2	2	**2.2**
CO2	2	3	2	3	1	2	2	3	2	3	**2.3**
CO3	3	2	2	2	2	2	3	2	3	2	**2.3**
CO4	3	2	3	2	2	3	3	2	3	2	**2.3**
CO5	3	2	3	3	2	2	3	2	3	3	**2.6**
Mean overall Score											**2.38 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	**23UEN12GE01**	General English - 1	**5**	**3**

Course Objectives
To enable learners to acquire self awareness and positive thinking required in various life situations
To help them acquire the attribute of empathy
To assist them in acquiring creative and critical thinking abilities
To enable them to learn the basic grammar
To assist them in developing LSRW skills

UNIT I: Self-awareness ELF-A (WHO) & Positive Thinking (UNICEF) (15 Hours)

Life Story

1. Chapter 1 from Malala Yousafzai, I am Malala
2. An Autobiography or The Story of My Experiments with Truth (Chapters 1, 2 & 3) M.K. Gandhi

Poem

3. Where the Mind is Without Fear – Gitanjali 35 – Rabindranath Tagore
4. Love Cycle – Chinua Achebe

UNIT II: Empathy (15 Hours)

Poem

5. Nine Gold Medals – David Roth
6. Alice Fell or poverty – William Wordsworth

Short Story

7. The School for Sympathy – E.V. Lucas
8. Barn Burning – William Faulkner

UNIT III: Parts of Speech (15 Hours)

9. Articles
10. Noun
11. Pronoun
12. Verb
13. Adverb
14. Adjective
15. Preposition

UNIT IV: Critical & Creative Thinking. (15 Hours)

Poem

16. The Things That Haven't Been Done Before – Edgar Guest
17. Stopping by the Woods on a Snowy Evening – Robert Frost

Readers Theatre

18. The Magic Brocade – A Tale of China

19. Stories on Stage – Aaron Shepard (Three Sideway Stories from Wayside School" by Louis Sachar)

Unit V: Paragraph and Essay Writing (15 Hours)

20. Descriptive
21. Expository
22. Persuasive
23. Narrative
24. Reading Comprehension

Teaching Methodology	Interactive methods, and multimedia presentations

Books for Study

1. Yousafzai, M. (2013). *I am Malala, Little.* Brown and Company.
2. Gandhi, M. K. (2011). *An Autobiography or The Story of My Experiments with Truth (Chapter – I).* Rupa Publications.
3. Tagore, R. (1913). *"Gitanjali 35" from Gitanjali (Song Offerings): A Collection of Prose Translations Made by the Author from the Original Bengali.* MacMillan.
4. Shepard, A. (2017). *Stories on Stage.* Shepard Publications.

Books for Reference

1. Krishnasamy. N. (1975). *Modern English: A Book of Grammar, Usage and Composition.* Macmillan.
2. Nesfield, J. C. (2019). *English Grammar Composition and Usage.* Macmillan.

Web Reources

1. https://archive.org/details/i-am-malala
2. https://www.indiastudychannel.com/resources/146521- Book-Review-An-Autobiography-or-The-story-of-my-experiments-with-Truth.aspx
3. https://www.poetryfoundation.org/poems/45668/gitanjali-35
4. https://amzn.eu/d/9rVzlNv
5. https://archive.org/details/in.ernet.dli.2015.44179

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Levels)**
CO1	discover self awareness and positive thinking required in various life situations	**K1**
CO2	classify the attributes of empathy	**K2**
CO3	apply creative and critical thinking skills	**K3**
CO4	focus on grammar for functional purposes	**K4**
CO5	integrate the LSRW skills for effective communication	**K5**

Relationship Matrix											
Semester	**Course code**		**Title of the Course**							**Hours**	**Credits**
1	**23UEN12GE01**		General English - 1							**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO2	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**2.5**
CO3	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**2**	**2.8**
CO4	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2.8**
Mean overall Score											**2.82 (High)**

Semester	Course code	Title of the Course	Hours/ Week	Credits
1	23UPH13CC01	**Core Course -1**: Properties of Mater and Acoustics	5	5

Course Objectives
To Study of the properties of matter leads to information which is of practical value to both the physicist and the engineers
To inform about the internal forces which act between the constituent parts of the substance
To provide students an insight of the principles of waves and oscillation and their characteristics
To understand the physics of acoustics of a building and methods of production of ultrasonic waves
To understand the properties of matter and apply the concepts in practical applications

UNIT I: Elasticity **(15 Hours)**

Hooke's law – stress-strain diagram – elastic constants –Poisson's ratio – relation between elastic constants and Poisson's ratio – work done in stretching and twisting a wire – twisting couple on a cylinder – rigidity modulus by static torsion– torsional pendulum (with and without masses)

UNIT II: Bending of Beams **(15 Hours)**

cantilever– expression for Bending moment – expression for depression at the loaded end of the cantilever– oscillations of a cantilever – expression for time period – experiment to find Young's modulus – non-uniform bending– experiment to determine Young's modulus by Koenig's method – uniform bending – expression for elevation – experiment to determine Young's modulus using microscope

UNIT III: Fluid Dynamics **(15 Hours)**

Surface tension: definition – molecular forces– excess pressure over curved surface – application to spherical and cylindrical drops and bubbles – determination of surface tension by Jaegar's method–variation of surface tension with temperature

Viscosity: definition – streamline and turbulent flow – rate of flow of liquid in capillary tube – Poiseuille's formula –corrections – terminal velocity and Stoke's formula– variation of viscosity with temperature

UNIT IV: Waves and Oscillations **(15 Hours)**

Simple Harmonic Motion (SHM) – differential equation of SHM – graphical representation of SHM – composition of two SHM in a straight line and at right angles – Lissajous's figures-free, damped, forced vibrations –resonance and Sharpness of resonance.

Laws of transverse vibration in strings –sonometer – determination of AC frequency using

sonometer–determination of frequency using Melde's string apparatus.

UNIT V: Acoustics of Buildings and Ultrasonics (15 Hours)

Intensity of sound – decibel – loudness of sound –reverberation – Sabine's reverberation formula – acoustic intensity – factors affecting the acoustics of buildings.

Ultrasonic waves: production of ultrasonic waves – Piezoelectric crystal method – magnetostriction effect – application of ultrasonic waves.

Teaching Methodology	Black board teaching, Video lectures, Demonstrations with models, Handouts

Books for Study

1. Mathur, D. S. (2007). *Elements of Properties of matter* (1st ed.). S. Chand & Company.
2. Brij, L. & Subrahmanyam, N. (2003). *Properties of matter* (1st ed.). S. Chand & Company.
3. Khanna, D. R. & Bedi, R. S. (1969). *Textbook of sound*. AtmaRam & sons.
4. Brij & Subrahmanyam, N. (1995). *A Text Book of sound*. Vikas Publishing House.
5. Murugesan, R. (2012). *Properties of matter*. S.Chand & Company.

Books for Reference

1. Smith, C. J. (1960). *General properties of matter* (1st ed.). Orient Longman Publishers.
2. Gulati, H. R. (1977). *Fundamental of general properties of matter* (5th ed.). R. Chand & Company.
3. French, A. P. (1973). *Vibration and waves*, MIT Introductory Physics, Arnold-Heinman.

Web Resources

1. https://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work
2. http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html
3. https://www.youtube.com/watch?v=gT8Nth9NWPM
4. https://www.youtube.com/watch?v=m4u-SuaSu1sandt=3s
5. https://www.biolinscientific.com/blog/what-are-surfactants-and-how-do-they-work
6. https://learningtechnologyofficial.com/category/fluid-mechanics-lab/
7. http://www.sound-physics.com/
8. http://nptel.ac.in/courses/112104026/

Course Outcomes		
CO No.	**CO-Statements** On the successful completion of the course, students will be able to	**Cognitive Levels (K - Level)**
CO1	acquire the knowledge on elastic moduli, elasticity and viscosity of liquids and gases, molecular theory of surface tension, diffusion, osmosis, acoustics of building and ultrasonics	**K1**
CO2	understand the concepts of elasticity, viscosity and surface tension in real situations, the diffusion in liquids, the methods of production of ultrasonic waves	**K2**
CO3	apply the knowledge to find the bending of beams, and to determine the molecular forces and excess pressure over curved surface	**K3**
CO4	apply the knowledge to determine the young modulus by Koenig's method and produce ultrasonic waves using piezoelectric crystal method	**K4**
CO5	analyze the bending moments in beams, flow of liquids in capillary tubes, surface tension of liquid versus temperature, different types of oscillations and factors affecting the acoustics of building	**K5**

		Relationship Matrix								
Semester	**Course code**	**Title of the Course**							**Hours**	**Credits**
1	**23UPH13CC01**	**Core Course -1**: Properties of Mater and Acoustics							**5**	**5**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**				**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**2**	**3**	**3**	**2**	**2**	**2**	**3**	**2**	**2**	**2**	**2.3**
CO2	**3**	**2**	**2**	**2**	**2**	**2**	**3**	**2**	**2**	**2**	**2.2**
CO3	**2**	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2.1**
CO4	**2**	**2**	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2.1**
CO5	**2**	**2**	**2**	**3**	**2**	**2**	**2**	**3**	**3**	**2**	**2.3**
Mean overall Score											**2.2 (High)**

Semester	Course code	Title of the Course	Hours/ Week	Credits
1	23UPH13CP01	**Core Practical - 1**: Properties of Matter	3	3

Any 12 Experiments

1. Determination of rigidity modulus without mass using Torsional pendulum
2. Determination of rigidity modulus with masses using Torsional pendulum
3. Determination of moment of inertia of an irregular body
4. Verification of parallel axes theorem on moment of inertia
5. Verification of perpendicular axes theorem on moment of inertia
6. Determination of moment of inertia and g using Bifilar pendulum
7. Determination of Young's modulus by stretching of wire with known masses
8. Verification of Hook's law by stretching of wire method
9. Determination of Young's modulus by uniform bending – load depression graph
10. Determination of Young's modulus by non-uniform bending – scale and telescope
11. Determination of Young's modulus by cantilever – load depression graph
12. Determination of Young's modulus by cantilever – oscillation method
13. Determination of Young's modulus by Koenig's method – (or unknown load)
14. Determination of rigidity modulus by static torsion
15. Determination of Y, n and K by Searle's double bar method
16. Determination of surface tension and interfacial surface tension by drop weight method
17. Determination of co-efficient of viscosity by Stokes' method – terminal velocity
18. Determination of critical pressure for streamline flow
19. Determination of Poisson's ratio of rubber tube
20. Determination of viscosity by Poiseullie's flow method
21. Determination radius of capillary tube by mercury pellet method
22. Determination of g using compound pendulum.

Semester	Course code	Title of the Course	Hours/Week	Credits
1	23UMA13AC01D	**Allied Course 1:** Mathematics for Physics 1	6	5

Course Objectives
To train the students to use their basic skills of differentiation for successive differentiation
To have knowledge on integration and its properties
To know the methods of solving differential equations
To explore the basic ideas of matrices
To understand the nature of series

UNIT I **(18 Hours)**

Higher Derivatives – Trigonometrical Transformation – Formation of Equation Involving Derivatives – Leibnitz's Formula for the nth Derivatives of a Product (Without Proofs)

UNIT II **(18 Hours)**

Properties of Definite Integrals - Integration by Parts - Reduction Formula for $x^n e^{ax}$, $x^n \cos ax$, $x^n \sin ax$, $\sin^n x$, $\cos^n x$, $\sin^m x \cos^n x$ and $\tan^n x$.

UNIT III **(18 Hours)**

First Order Differential Equations - Variable Separable - Homogenous Equations- Non-Homogenous Equations - Linear Equation - Bernoulli's Equation-Second Order Differential Equations - Linear Equation with Constant Coefficients.

UNIT IV **(18 Hours)**

Matrices - Rank of a Matrix - Solving Simultaneous Linear Equations in Three Unknowns Using Elementary Operations Method - Eigen Values and Eigen Vectors - Verification of Cayley Hamilton Theorem.

UNIT V **(18 Hours)**

Concept of Limit of a Sequence - Limit of a Function - Simple Problems -Convergence, Divergence and Oscillation of a Series - Geometric Series -Tests of Convergence and Divergence, Comparison Test, Ratio Test and Root Test (Without Proofs).

Teaching Methodology	Lectures, Demonstrations

Books for Study

1. Narayanan, S., Rao, R. H., Pillay, T. K. M. & Kandaswamy. (2009). *Ancillary mathematics, Vol-I*. Viswanathan, S., Printers & Publishers Pvt Ltd.

Unit I: Chapter 6 – Sec 6.1, pp: 266-281

Unit IV: Chapter 3 – Sec 3.2 - 3.4, pp: 137-160.

2. Narayanan, S., Rao, R. H., Pillay, T. K. M. & Kandaswamy. (2010). Ancillary mathematics, Vol-II. Viswanathan, S., Printers & Publishers Pvt Ltd.

Unit II: Chapter 1 – Sec 11, Sec 12, pp: 68-72 , Sec 13.1-13.6, pp: 61-67, 73-82.

3. Narayanan, S. & Pillay, T. K. M. (2001). *Differential equations and its applications*. Viswanathan, S., Printers & Publishers Pvt Ltd.

Unit III: Chapter 2- Sec 1-5, pp.7-19, Chapter 5- Sec 1-4, pp: 68-88.

1. Venkataraman, M. K. (1986). *Higher mathematics for engineering and science* (3rd ed.). The National Publishing Company, Madras.

Unit V: Chapter 6 – Sec 1-14.

Books for Reference

1. Narayanan, S. & Pillay, T. K. M. (1999), *Ancillary mathematics, Book II*. Viswanathan, S., Printers & Publishers Pvt Ltd.

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels**
	On successful completion of this course, students will be able to	**(K - Level)**
CO1	attain knowledge of higher derivatives, definite integrals, first and second order differential equations, matrices and infinite series.	**K1**
CO2	understand formation of equations involving derivatives, trigonometrical transformation in derivatives, properties of definite integrals operations and properties of matrices and convergence of series.	**K2**
CO3	illustrate integration by parts, reduction formula, simultaneous linear equations in three unknowns, different methods in first order differential equations and convergence of series.	**K3**
CO4	verify integration by parts, Leibnitz's formula, reduction formula, linear equation, Bernoulli's equation, Cayley Hamilton theorem and comparison test, ratio test and root test.	**K4**
CO5	evaluate definite integrals, reduction formula, solutions of first and second order differential equations, rank of a matrix eigenvalues and eigenvectors and convergence.	**K5**

Relationship Matrix

Semester	**Course code**			**Title of the Course**			**Hours**	**Credits**	
1	**23UMA13AC01D**			**Allied Course 1:** Mathematics for Physics 1			**6**	**5**	
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**3**	**3**	**3**	**2**	**2**	**1**	**2**	**3**	**1**	**2**	**2.2**
CO2	**3**	**2**	**2**	**3**	**3**	**3**	**3**	**2**	**2**	**3**	**2.6**
CO3	**2**	**2**	**2**	**3**	**2**	**3**	**3**	**3**	**2**	**3**	**2.5**
CO4	**2**	**2**	**1**	**1**	**2**	**2**	**3**	**2**	**2**	**2**	**1.9**
CO5	**2**	**1**	**2**	**1**	**2**	**2**	**3**	**2**	**2**	**3**	**2**
Mean overall Score											**2.24 (High)**

Semester	Course Code	Title of the Course	Hours/ Week	Credits
1	23UPH14FC01	**Foundation Course**: Introductory Physics	2	2

COURSE OBJECTIVES
To help students get an overview of Physics before learning their core courses
To serve as a bridge between the school curriculum and the degree programme
To know the basics of vectors and types of forces
To understand the concepts of momentum, energy conservation and the dynamics of various systems
To know the foundations of properties of matter

UNIT I: Introduction to Vectors (6 Hours)

Vectors, scalars –examples for scalars and vectors from physical quantities – addition, subtraction of vectors – resolution and resultant of vectors – units and dimensions– standard physics constants

UNIT II: Types of Forces (6 Hours)

Types of forces–gravitational, electrostatic, magnetic, electromagnetic, nuclear –mechanical forces like, centripetal, centrifugal, friction, tension, cohesive, adhesive forces

UNIT III: Momentum and Energy Conservation (6 Hours)

Different forms of energy– conservation laws of momentum, energy – types of collisions – angular momentum– alternate energy sources–real life examples

UNIT IV: Dynamics (6 Hours)

Types of motion– linear, projectile, circular, angular, simple harmonic motions – satellite motion – banking of a curved roads – stream line and turbulent mot ions – wave motion – comparison of light and sound waves – free, forced, damped oscillations

UNIT V: Properties of Matter (6 Hours)

Surface tension – shape of liquid drop – angle of contact – viscosity –lubricants – capillary flow – diffusion – real life examples– properties and types of materials in daily use- conductors, insulators – thermal and electric

Books for Study

1. Verma, H. C. (2021). *Concepts of physics.* Vol 1 and 1st Edition, Bharati Bhawan (Publishers & Distributors).
2. Mathur, D. S. (2007). *Elements of properties of matter* (1st ed.). S. Chand & Company.
3. Brij, L. & Subrahmanyam, N. (2003). *Properties of matter* (1st ed.). S. Chand & Company.

Books for Reference

1. Gulati, H. R. (1977). *Fundamental of general properties of matter* (5th ed.). S. Chand & Company.
2. Young, H. D., Freedman, R. A. & Ford, A. L. (2021). *University physics with modern physics* (15th ed.). Pearsons Education.
3. Halliday, D., Resnick, R. & Walker, J. (2010). *Fundamentals of physics* (9th ed.). Wiley.

Web Resources

1. http://hyperphysics.phy-astr.gsu.edu/hbase/permot2.html
2. https://science.nasa.gov/ems/
3. https://eesc.columbia.edu/courses/ees/climate/lectures/radiation_hays/

Teaching Methodology	Chalk and talk, PPT, Pictorial models, Experimental and Graphical representation using software, simulation.

Course Outcomes		
CO No.	**CO-Statements** On the successful completion of the course, student will be able to	**Cognitive Levels (K - Level)**
CO1	recall and relate various concepts of elementary physics.	**K1**
CO2	summarize and translate statics and dynamics phenomena in physics and bridge the introduction from school physics to a graduate level.	**K2**
CO3	apply the concept of all the above mentioned and develop various other concept of physics in matter and nature. Also, interpret the mathematical theory behind various physics.	**K3**
CO4	on the successful completion of the course, student will be able to	**K4**
CO5	recall and relate various concepts of elementary physics.	**K5**

Relationship Matrix											
Semester	**Course code**	**Title of the Course**								**Hours**	**Credits**
1	**23UPH14FC01**	**Foundation Course**: Introductory Physics								**2**	**2**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**3**	**3**	**2**	**2**	**1**	**3**	**3**	**3**	**2**	**2**	**2.4**
CO2	**3**	**3**	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**2**	**2.5**
CO3	**3**	**3**	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**2**	**2.5**
CO4	**3**	**3**	**2**	**2**	**1**	**3**	**3**	**3**	**2**	**2**	**2.4**
CO5	**3**	**3**	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**2**	**2.5**
Mean overall Score											**2.46 (High)**

Semester	Course Code	Title of the Course	Hours/ Week	Credits
1	23UPH14SE01A	**Skill Enhancement Course – 1 (Non Major Elective)**: Physics for Everyday Life	2	2

Course Objectives
To understand the basic laws of classical mechanics that apply to mechanical objects
To examine the underlying scientific principles and functioning of optical instruments and their applications in various everyday situations
To explore the physics of home appliances which enables to appreciate the scientific principles that govern their functionality
To grasp the principles behind solar cells and the efficient conversion of sunlight into electricity and to appreciate the benefits of harnessing solar power and its potential to reduce the reliance on non-renewable energy sources
To Familiarize the notable achievements of Indian physicists and their contributions to the global scientific community

UNIT I: Mechanical Objects (6 Hours)

Laws of motion- Hook's law-conservation of energy-conservation of momentum-force-friction- Spring scales – Bouncing balls –Roller coasters – Bicycles –Rockets and space travel.

UNIT II: Optical Instruments and Laser (6 Hours)

Vision corrective lenses – Polaroid glasses – UV protective glass – Polaroid camera – Colour photography – Holography and Laser

UNIT III: Physics of Home Appliances (6 Hours)

Bulb – structure- types- Fluorescent Electric Bulb- LED- Halogen Bulb-Fan – Hair drier – Television – Air conditioners – Microwave oven – Vacuum cleaners

UNIT IV: Solar Energy (6 Hours)

Solar constant – General applications of solar energy – Solar water heaters – Solar Photo – voltaic cells – General applications of solar cells

UNIT V: Indian Physicists and their Contributions (6 Hours)

C.V. Raman, Homi Jehangir Bhabha, Vikram Sarabhai, Subrahmanyan Chandrasekhar, Venkatraman Ramakrishnan, Dr. APJ Abdul Kalam and their contribution to science and technology.

Teaching Methodology	Videos, PPT and Demonstration

Books for Study

1. Ammara, U & Gugucool. (2019). *The physics in our daily lives*.
2. Lawin, W. (2011). *For the love of physics*. Free Press.
3. Roy, G. D. (2014). *Solar energy utilisation* (5thed.). Khanna Publishers.

Books for Reference

1. Mathur, D. S. (2010), *Elements of properties of matter.* S. Chand & Company.
2. Ghatak, A. (2017). *Optics*. Tata McGraw-Hill publishing Company Ltd.
3. Tiwari, G. N. (2002). *Solar energy fundamentals- Design, modelling and applications*, Alpha Science.
4. Cauldwell, R. (2014). *Wiring a house*. Taunton Press.
5. Cengaga. (2017). *The great indian scientists*. Indian Pvt., Ltd.

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	apply the principles of Physics to everyday life	**K3**
CO2	examine the fundamental laws of Physics and discover its importance	**K4**
CO3	interpret the concepts learnt to daily life by recognizing the physics of mechanical objects, home appliances, solar energy, and their influence in modern world.	**K5**

		Relationship Matrix								
Semester	**Course code**	**Title of the Course**							**Hours**	**Credits**
1	**23UPH14SE01A**	**Skill Enhancement Course – 1 (Non Major Elective)**: Physics for Everyday Life							**2**	**2**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**				**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	**3**	**3**	**3**	**2**	**2**	**3**	**2**	**2**	**2**	**1**	**2.3**
CO2	**3**	**3**	**2**	**2**	**2**	**3**	**2**	**3**	**2**	**1**	**2.3**
CO3	**3**	**3**	**3**	**2**	**1**	**3**	**3**	**1**	**2**	**1**	**2.3**
Mean overall Score											**2.3 (High)**

Semester	Course Code	Title of the Course	Hours/ Week	Credits
1	23UPH14SE01B	**Skill Enhancement Course - 1 (Non Major Elective)**: Home Electrical Installation	2	2

Course Objectives
To know the fundamental principles behind of electrical circuits
To understand the process of production and transmission of electricity
To know the basics of electrical instruments and measurements
To understand the calculation of electricity bill
To know the safety and servicing measures during electrical installations

UNIT I: Simple Electrical Circuits (6 Hours)

Charge, current, potential difference, resistance – simple electrical circuits – DC ammeter, voltmeter, ohmmeter – Ohm's law – difference between DC and AC – advantages of AC over DC – electromagnetic induction - transformers – inductors/chokes – capacitors/condensers – impedance – AC ammeter, voltmeter –symbols and nomenclature

UNIT II: Transmission of Electricity (6 Hours)

Production and transmission of electricity – concept of power grid – Series and parallel connections – technicalities of junctions and loops in circuits –transmission losses (qualitative) – roles of step-up and step-down transformers – quality of connecting wires – characteristics of single and multicore wires

UNIT III: Electrical Wiring (6 Hours)

Different types of switches – installation of two way switch – role of sockets, plugs, sockets - installation of meters – basic switch board – electrical bell – indicator – fixing of tube lights and fans – heavy equipment like AC, fridge, washing machine, oven, geyser, jet pumps – provisions for inverter – gauge specifications of wires for various needs

UNIT IV: Power Rating and Power Delivered (6 Hours)

Conversion of electrical energy in to different forms – work done by electrical energy – power rating of electrical appliances – energy consumption – electrical energy unit in kWh – calculation of EB bill – Joule's heating – useful energy and energy loss – single and three phase connections – Measures to save electrical energy – energy audit

UNIT V: Safety Measures (6 Hours)

Insulation for wires – colour specification for mains, return and earth – Understanding of fuse and circuit breakers – types of fuse: kit-kat, HRC, cartridge, MCB, ELCB – purpose of earth line – lighting arrestors – short circuiting and over loading – electrical safety – tips to avoid electrical shock – first aid for electrical shock – fire safety for electric current

Teaching Methodology	Lectures, Demonstrations, Presentations and Videos

Books for Study

1. Scaddan, B. (2019). *Electrical installation Work* (9th ed.). Routledge.
2. Cauldwell, R.(2014). *Wiring a house* (5th ed.).
3. Black, & Decker. (2018). Advanced home wiring: Backup power, panel upgrades, AFCI protection, "smart" thermostats, + more. Cool Springs Press.
4. Ryan, K. (2022). *Complete beginners guide to rough in electrical wiring*.

Books for Reference

1. Schaltz, M. E. (2011). *Grob's basic electronics*, McGraw Hill (11th ed.).
2. Gussow, M. (2007). *Schaum's outline of basic electricity*, The McGraw-Hill.

Web Resources

1. https://ncert.nic.in/vocational.php?kvcj1=0-5
2. https://ncert.nic.in/vocational.php?kvdl1=0-5

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	apply the fundamentals of domestic electrical installation with safety precautions and servicing	**K3**
CO2	analysis the working of electrical circuits, instruments, electricity transmission, wiring techniques, power ratings and safety	**K4**
CO3	evaluate the principles of electricity to install and service home electrical systems	**K5**

		Relationship Matrix								
Semester	**Course code**	**Title of the Course**							**Hours**	**Credits**
1	**23UPH14SE01B**	**Skill Enhancement Course - 1 (Non Major Elective)**: Home Electrical Installation							**2**	**2**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**				**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**3**	**2**	**2**	**2**	**1**	**3**	**2**	**2**	**2**	**1**	**2.0**
CO2	**3**	**2**	**2**	**2**	**1**	**3**	**2**	**2**	**2**	**1**	**2.0**
CO3	**3**	**2**	**2**	**2**	**1**	**3**	**2**	**3**	**2**	**1**	**2.1**
Mean overall Score											**2.03 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UHE14VE01	**Value Education - 1:** Essentials of Humanity	2	1

Course Objectives
To identify one's own potentials, strengths and weaknesses
To identify various challenges (physical, emotional, and social) in adolescence
To consciously overcome one's challenges and move towards self-esteem
To maximize one's own potential in enabling a holistic development
To assimilate human values comprehensively

UNIT I: Principles of Value Education

Introduction to values - Characteristics and Roots of Values - Value Education & Value Clarification - Moral Characters - Kinds of Values - Objectives of Values

UNIT II: Development of Human Personality

Personality: Introduction, Theories, Integration & Factors influencing the development of personality - SEL Series - Discovering self - Defence Mechanism Power of positive thinking - Why worry?

UNIT III: The Dimensions of Human Development

Areas of Development: Physical, Intellectual, Emotional, Social Development, Moral & Spiritual development

UNIT IV: Responsible Parenthood

Human Sexuality - Marriage and Family - Sex and Love - Characteristics of Responsible parent - Causes of Marriage disharmony - Art of wise parenting

UNIT V: Gender Equality and Empowerment

Historical perspective - Women in Independence struggle - Women in Independent India - Education & Economic development - Crimens against Women - Women rights - Time-line of Women achievements in India

Teaching Methodology	

Book for Study

Department of Human Excellence. (2021). *Essentials of Humanity.* St. Joseph's College.

Books for Reference

1. Xavier, A. (2012). *You Shall Overcome,* (6th ed.). ICRDE Publication.
2. Alex, K. (2009). *Soft Skills.* S. Chand.
3. Kalam, A.A. P. J. (2012). *You Are Unique.* Punya Publishing.

Websites and eLearning Sources

1. http://livingvalues.net. Accessed 05 March 2021.
2. http://www.apa.org/topics/personality#. Accessed 05 March 2021.
3. http://www.peacecorps.gov/educators/resources/global-issues-gender-equaligy-and-womens-empowerment/. Accessed 05 March 2021.

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On completion of this course, students will be able to	
CO1	recall the prescribed values and their dimensions.	**K1**
CO2	examine themselves by learning the developmental changes happening in the course of their lifetime.	**K2**
CO3	Apply the trained values in the day-to-day life.	**K3**

Relationship Matrix											
Semester	**Course code**	**Title of the Course**								**Hours**	**Credits**
1	**23UHE14VE01**	**Value Education - 1:** Essentials of Humanity								**2**	**1**
Course Outcomes	**Programme Outcomes(POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	2	3	3	2	3	3	
CO2	3	2	2	3	3	2	3	3	2	2	
CO3	2	3	3	3	2	3	3	3	3	3	
Mean overalls core											

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UTA21GL02	General Tamil - 2	4	3

கற்றலின் நோக்கங்கள்
தமிழ் இலக்கிய வரலாற்றை அறிதல்.
எழுத்து, சொல் இலக்கணங்களின் அடிப்படைகளைக் கண்டறிதல்.
அயலகக் கவிதை வடிவங்களை விளங்கிக் கொள்ளுதல்.
மொழிபெயர்ப்புக் கவிதைகளின் வாயிலாக மொழிபெயர்ப்புத் திறனை வளர்த்தெடுத்தல்.
போட்டித் தேர்வுகளை எதிர்கொள்வதற்கான இலக்கண அறிவு பெறுதல்.

அலகு – 1 **(12 மணிநேரம்)**

பாரதியார் கவிதைகள் – குயில்பாட்டு (குயில் தன் பூர்வ ஜென்மக் கதை உரைத்தல்)
பாரதிதாசன் கவிதைகள் – சஞ்சீவி பர்வதத்தின் சாரல்
நற்றமிழ்க்கோவை – முதல் மூன்று கட்டுரைகள்

அலகு - 2 **(12 மணிநேரம்)**

வெ.இராமலிங்கனார் – சொல், தமிழன் இதயம்
முடியரசனார் – உயிர் வெல்லமோ, மனத்துயர்மை
பெருஞ்சித்திரனார் – அஞ்சாதீர், மொழி,இனம்,நாடு
பட்டுக்கோட்டை கலியாண சுந்தரனார் – வருங்காலம் உண்டு, உழைக்காமல் சேர்க்கும் பணம்
இலக்கணம் – எழுத்து
இலக்கிய வரலாறு – புதுக்கவிதை, தமிழில் புதிய கவிதை வடிவங்கள்

அலகு–3 **(12மணி நேரம்)**

சுரதா - நல்ல தீர்ப்பு
கண்ணதாசன் - ஒரு பானையின் கதை
அப்துல் ரகுமான்- வீடு
மேத்தா - ஒரேகுரல்
இலக்கிய வரலாறு – தமிழ்ச்சிறுகதைகள், இருபதாம் நூற்றாண்டு உரைநடை வளர்ச்சி
சிறுகதை – முதல் மூன்று சிறுகதைகள்

அலகு – 4 **(12 மணிநேரம்)**

அரசியல் கவிதைகள்
ஈரோடு தமிழன்பன்- அகல் விளக்காக இரு
ஆதவன் தீட்சண்யா– இன்னும் இருக்கும் சுவர்களின் பொருட்டு
சுகிர்தராணி– என் கண்மணியே இசைப்பிரியா
சக்தி ஜோதி – யுகாந்திர உறக்கம்
பழநி பாரதி- வெள்ளைக்காகிதம்
லிவிங்ஸ்மைல் வித்யா – நினைவில் பால்யம் அழுத்தம்
இலக்கணம் - சொல்

அலகு – 5 **(12 மணிநேரம்)**

அயலகக் கவிதைகள்
ஓசேரிசால் (தமிழில் நெய்தல்)- விடைகொடு என்தாய் மண்ணே
ஹைபுன் கவிதைகள்
சிறுகதை – நான்கு முதல் ஆறு சிறுகதைகள்
நற்றமிழ்க் கோவை – நான்கு முதல்ஆறு கட்டுரைகள்

கற்பித்தல் முறை (Teaching Methodology)	**விரிவுரை** (Lecture), **காணொளிக் காட்சி** (Videos), **விளக்கக் காட்சி** (PPT presentation)

பாடநூல்கள்

1. *தமிழாய்வுத்துறை* (2023). *பொதுத்தமிழ் -2, தூய வளனார் தன்னாட்சிக் கல்லூரி.*
2. *தமிழாய்வுத்துறை* (2021). *நற்றமிழ்க் கோவை, தூய வளனார் தன்னாட்சிக் கல்லூரி.*

Websites and eLearning Sources

1. https://www.chennailibrary.com/bharathiyar/kuyilpattu.html
2. www.tamildigitallibrary.in
3. https://eluthu.com/kavithai
4. https://podhutamizh.blogspot.com/2017/09/blog-post_42.html
5. https://thamizhsudar.com
6. https://ta.wikipedia.org/wiki

Course Outcomes		
CO No.	**CO-Statements** ***இப்பாடத்தின் நிறைவில் மாணவர்கள்***	**Cognitive Levels (K - Level)**
CO1	*தமிழ் இலக்கிய நூல்கள் பற்றிய அறிவைப் பெறுவர்.*	**K1**
CO2	*தமிழ் இலக்கண வளர்ச்சியைப் புரிந்து கொள்வர்.*	**K2**
CO3	*பிழையின்றி எழுதும் திறன் பெறுவதோடு கற்றல் திறனையும் வளர்த்துக்கொள்வர்.*	**K3**
CO4	*பிற கவிதை வடிவங்களைக் கையாளும் திறன் பெறுவர்.*	**K4**
CO5	*போட்டித் தேர்வுகளை எதிர்கொள்ளும் திறனைப் பெறுவர்.*	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
2	**23UTA21GL02**			General Tamil - 2					**4**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	1	2	2	3	3	3	2	3	2	**2.3**
CO2	2	1	2	2	2	3	2	2	2	2	**2.0**
CO3	2	1	2	2	3	3	3	2	3	2	**2.3**
CO4	1	2	1	2	2	3	2	2	3	2	**2.0**
CO5	1	1	2	2	3	3	3	2	3	2	**2.2**
										Mean Overall Score	**2.16 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UFR21GL02	French - 2	4	3

Course Objectives
To construct simple phrases with pronominal verbs
To apply the different types of articles
To understand the usage of pronouns
To analyse the French culture through French culinary art
To evaluate and compare the French fashion in current scenario

UNIT I: **(12 Hours)**

- TITRE: Les Loisirs
- GRAMMAIRE : les adjectifs interrogatifs, les nombres ordinaux, les verbes pronominaux
- LEXIQUE : les différentes activités quotidiennes, les loisirs, les activités quotidiennes, les matières
- PRODUCTION ORALE : parler sur votre passe-temps
- PRODUCTION ECRITE : décrire sa journée

UNIT II: **(12 Hours)**

- TITRE: La routine
- GRAMMAIRE : les pronoms personnels COD, les verbes du premier groupe en e/er/eler/eter, le verbe prendre
- LEXIQUE : exprimer ses goûts et ses préférences, le temps, l'heure, la fréquence
- PRODUCTION ORALE : savoir comment dire l'heure
- PRODUCTION ECRITE : écrire vos préférences en quelques lignes

UNIT III: **(12 Hours)**

- TITRE: Où Faire Ses Courses?
- GRAMMAIRE : les articles partitifs, le pronom en (la quantité), très ou beaucoup
- LEXIQUE : inviter et répondre à une invitation, les commerces et les commerçants, demander et dire le prix, les quantités
- PRODUCTION ORALE : faire des courses pour une soirée
- PRODUCTION ECRITE : écrire un message en acceptant l'invitation

UNIT IV: **(12 Hours)**

- TITRE: Découvrez et Dégustez
- GRAMMAIRE : l'impératif, il faut, les verbes devoir, pouvoir, savoir, vouloir
- LEXIQUE : Commander et commenter sur un plat de la carte, les aliments, les services, les moyens de paiement
- PRODUCTION ORALE : Jeu de rôle – au restaurant (entre vous et le garçon)
- PRODUCTION ECRITE : faire une comparaison avec la carte française et indienne

UNIT V: **(12 Hours)**

- TITRE: Tout le monde s'amuse/ les ados au quotidien
- GRAMMAIRE : les adjectifs démonstratifs, le pronom indéfini on, le futur proche, le passé composé, les verbes en –yer, voir et sortir
- LEXIQUE : connaître les marques connues sur les vêtements, les sorties, situer dans le temps, les vêtements et les accessoires

- PRODUCTION ORALE : décrire une tenue
- PRODUCTION ECRITE : écrire une lettre amicale, une carte postale

Teaching Methodology	Chalk and talk, visual cues like flashcards, one to one conversation

Book for Study

1. Dauda, P., Giachino, L. & Baracco, C. (2016). *Generation A1.* Didier.

Books for Reference

1. Girardet, J. & Pecheur, J. (2017). *Echo A1.* CLE International, (2nd Ed.).
2. Mérieux, R. & Loiseau, Y. (2012). *Latitudes A1.* Didier.
3. Fournier, I. (2011). *Talk French.* Goyal Publishers.

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1. https://www.frenchtoday.com/blog/french-verb-conjugation/french-reflexive-verbs-list- exercises/
2. https://www.fluentu.com/blog/french/french-subject-pronouns/
3. https://grammarist.com/french/french-partitive-article/
4. https://www.talkinfrench.com/guide-french-food-habits/
5. https://www.fluentu.com/blog/french/talking-about-clothes-in-french/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Levels)**
CO1	Relate pronominal verbs in expressing one's day today activity	**K1**
CO2	compare the different types of articles – article partitif and contracte	**K2**
CO3	construct texts using pronouns – passages and dialogues	**K3**
CO4	discover the food habits of the French culture	**K4**
CO5	appraise the French fashion	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
2	**23UFR21GL02**			**French - 2**					**4**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	1	3	1	2	2	2	**2.2**
CO2	2	1	2	3	2	3	1	2	2	2	**2.0**
CO3	3	2	3	2	2	3	3	1	3	2	**2.4**
CO4	3	2	2	1	3	3	3	1	1	3	**2.2**
CO5	2	1	2	2	3	3	3	2	2	2	**2.2**
Mean Overall Score											**2.2 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UHI21GL02	HINDI - 2	4	3

Course Objectives
To understand the basics of Hindi Language
To make the students to be familiar with the Hindi words
To enable the students to develop their effective communicative skills in Hindi
To introduce the socially relevant subjects in Modern Hindi Literature
To empower the students with globally employable soft skills

UNIT I: **(12 Hours)**

- Kafan
- Letter Writing - Chutti Patra
- Bakthikal - Namakarn
- Sarkari Kariyalayom Ka Naam

UNIT II: **(12 Hours)**

- Baathcheeth - Dookan Mein
- Kriya
- Letter Writing - Rishthedarom Ko Patra
- Bakthikal - Samajik Paristhithiyam

UNIT III: **(12 Hours)**

- Vah Thodthi Patthar
- Adverb
- Letter Writing - Naukari Keliye Avedan Patra
- Bakthikal - Sahithyik Paristhithiyam

UNIT IV: **(12 Hours)**

- Mukthi
- Samas
- Letter Writing - Kitab Maangne Keliye Patra
- Bakthikal - Salient Features, Main Divisions

UNIT V: **(12 Hours)**

- Anuvad
- Sandhi
- Letter Writing - Nagarpalika Ko Patra
- Bakthikal - Visheshathayem

Teaching Methodology	Peer Instruction Exercise, Videos, PPT, Quiz, Group Discussion

Books for Study

1. Viswanath Tripaty. (2018). *Kuchh Kahaniyan*, Rajkamal Prakashan Pvt. Ltd.
2. Kamathaprasad Gupth, M. (2020). *Hindi Vyakaran*. Anand Prakashan.

3. Sadananth Bosalae. (2020). *kavya sarang*, Rajkamal Prakashan.

Books for Reference

1. Acharya Ramchandra Shukla. (2021). *Hindi Sahitya Ka Itihas*. Prabhat Prakashan.
2. Krishnakumar, G. (2016). *Anuvad vigyan ki Bhumika*. Rajkamal Prakashan.
3. Aravind Kumar. (2019). *Sampoorna Hindi Vyakaran our Rachana*, Lucent publisher.
4. Lakshman Prasad Singh. (2017). *Kavya ke sopan*. Bharathy Bhavan Prakashan.

Websites and e-Learning Sources

1. https://hindigrammar.in/sandhi.html
2. https://www.successcds.net/class10/hindi/samas-in-hindi
3. https://mycoaching.in/kriya-ke-bhed-verb-in-hindi
4. https://namastesensei.in/adverb-in-hindi-examples/
5. https://viahindi.in/hindi-vyakaran/sandhi-paribhasha-prakar-or-udaharan

Course Outcomes		
CO No.	**CO-Statements** On successful completion of the course, the student will be able to	**Cognitive Levels (K - Level)**
CO1	Find out the Terms & Expressions related to letter writing.	**K1**
CO2	Explain the works of Hindi writers.	**K2**
CO3	Complete the sentences in Hindi using basic grammar.	**K3**
CO4	Analyze the social & political conditions of Devotional period in Hindi Literature.	**K4**
CO5	Justify the human values stressed on the works of the following authors “Premchand, Nirala, etc.”.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**	
2	**23UHI21GL02**			**HINDI - 2**				**4**		**3**	
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	3	2	2	3	3	3	2	2	**2.5**
CO2	1	3	1	2	2	3	3	3	2	3	**2.3**
CO3	3	2	3	2	2	3	2	3	2	2	**2.4**
CO4	2	3	3	1	3	2	3	2	1	2	**2.2**
CO5	3	2	2	2	3	2	3	2	3	2	**2.4**
										Mean Overall Score	**2.36 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23USA21GL02	Sanskrit - 2	4	3

Course Objectives
To bring out the salient aspects of classical Sanskrit poetry
To introduce court epics in Sanskrit
To train students in declensions of pronouns in Sanskrit
To coach the students in the conjugation patterns of verbs in Sanskrit
To offer coaching in morpho-phonemic rules and their applications in Sanskrit

UNIT I **(12 Hours)**

Asmathi usmath tat kim (MFN) sarvanaam asabdaha

UNIT II **(12 Hours)**

Sandhi Niyamaah Abhyaash (Guna , Visarga , Dirgha , Vrddhi)

UNIT III **(12 Hours)**

Lang lakaarah Kriyapadaani Prayoga Vivaranam

UNIT IV **(12 Hours)**

Raguvamsaha Pratama sargaha (1 –15 slokas)

UNIT V **(12 Hours)**

Suvacanani Vakya Prayoga Vivaranam

Teaching Methodology	Videos, PPT, Blackboard, Demonstration, Exercises

Books for Study

1. Saralasamkritham Skisha. (2021).
2. Dhaatu Manjari. (2021).

Books for Reference

1. Paindrapuram Ashram, Srirangam. (2019).
2. Vadhyar, R. S., & Sons, Book – Seller and Publishers. (2021).
3. Kulapthy, K. M. (2018). *Saral Sanskrit Balabodh*. Bharathiys Vidya Bhavan.

Websites and eLearning Sources

1. https://www.meritnation.com
2. https://www.aplustopper.com
3. https://mycoaching.in/lang-lakar
4. https://sanskritdocuments.org/sites/giirvaani/giirvaani/rv/sargas/01_rv.htm
5. https://resanskrit.com/blogs/blog-post/sanskrit-shlok-popular-quotes-meaning-hindi-english

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Remembering names of different objects, remembering different verbal forms and sandhi	**K1**
CO2	Contrast different verbal forms Explain good sayings, Relate good saying to life.	**K2**
CO3	Apply and build small sentences	**K3**
CO4	Analyze different forms of Verbs and nouns	**K4**
CO5	Appreciate subhashitas and Sanskrit poetry	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23USA21GL02**			Sanskrit - 2						**4**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	1	3	2	2	2	3	3	2	1	**2.1**
CO2	3	2	3	2	2	3	2	3	3	2	**2.5**
CO3	2	2	3	2	2	2	2	3	3	1	**2.1**
CO4	3	2	3	3	1	2	3	3	3	1	**2.4**
CO5	3	2	2	2	3	2	2	3	3	1	**2.3**
										Mean Overall Score	**2.28 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UEN22GE02	General English - 2	5	3

Course Objectives
To develop an expanded and specialised vocabulary related to diverse themes such as education, entertainment, career, and society through activities like word grids, reading, and discussions.
To enhance problem-solving abilities through activities like debates, role-playing, and scenario analysis.
To enable students to express ideas with precision and clarity by practising different forms of expressing quality, comparison, and actions in various contexts.
To equip students with language skills relevant to professional settings.
To encourage students to explore language as a tool for creative expression and communication.

UNIT I **(15 Hours)**

01. Education Word Grid
02. Reading Problems and Solutions
03. Syllabification
04. Forms for Expressing Quality
05. Expressing Comparison
06. Monosyllabic Comparison
07. Di/polysyllabic Comparison
08. The Best Monosyllabic Comparison
09. The Best Di/Polysyllabic Comparison
10. Practising Quality Words

UNIT II **(15 Hours)**

11. Wh Words
12. Yes/No Recollection
13. Unscramble Wh Questions
14. Wh Practice
15. Education and the Poor
16. Controlled Role Play
17. Debate on Education
18. Education in the Future
19. Entertainment Word Grid
20. Classify Entertainment Wordlist
21. Guess the Missing Letter
22. Proverb-Visual Description
23. Supply Wh Words
24. Rearrange Questions
25. Information Gap Questions

UNIT III **(15 Hours)**

26. Asking Questions
27. More about Actions
28. More about Actions and Uses
29. Crime Puzzle
30. Possessive Quiz
31. Humourous News Report

32. Debate on Media and Politics
33. Best Entertainment Source

UNIT IV **(15 Hours)**

34. Career Word Grid
35. Job-Related Wordlist
36. Who's Who?
37. People at Work
38. Humour at Workplace
39. Profession in Context
40. Functions and Expressions
41. Transition Fill-in
42. Transition Word Selection
43. Professional Qualities
44. Job Procedures
45. Preparing a Resume
46. Interview Questions
47. Job Cover Letter Format
49. Emailing an Application
50. Mock Interview

UNIT V **(15 Hours)**

51. Society Word Grid
52. Classify Society Wordlist
53. Rearrange the Story
54. Storytelling
55. Story Cluster
56. Words Denoting Time
57. Expressing Time
58. What Can You Buy?
59. Noise Pollution
60. Positive News Headlines
61. Negative News Headlines
62. Matching Conditions
63. What Would You Do?
64. If I were the Prime Minister
65. My Dream Country

Teaching Methodology	Lecture Method, Use of ICT Tools and Interactive method

Book for Study

1. Joy, J.L. & Peter, F.M. (2014). *Let's Communicate 2*, Trinity Press.

Books for Reference

1. Ahrens, Sönke. (2017). *How to Take Smart Notes: One Simple Technique to Boost Writing, Learning and Thinking*. Create Space.
2. Aspinall, Tricia. (2002). *Test Your Listening.* Pearson.
3. Bailey, Stephen. (2004). *Academic Writing: A Practical Guide for Students*. Routledge.
4. Fitikides, T.J. (2002). *Common Mistakes in English,* (6th Ed.). Longman
5. Wainwright., Gordon. (2007). *How to Read Faster and Recall More: Learn the Art of Speed Reading with Maximum Recall,* (3rd Ed.). How to Books.

Websites and eLearning Sources

1. https://learnenglish.britishcouncil.org/
2. https://oneminuteenglish.org/en/best-websites-learn-english/

3. https://www.dailywritingtips.com/best-websites-to-learn-english/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	write paragraphs with apt punctuation marks	**K1**
CO2	discuss basic issues with friends, relatives and members of the family	**K2**
CO3	use polite expressions in appropriate ways	**K3**
CO4	evaluate the language and communication aspects of the topics	**K4**
CO5	create and produce various forms of communication, including professional documents like resumes and cover letters, debates	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
2	**23UEN22GE02**			**General English - 2**					**5**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	2	2	3	2	3	2	3	2	**2.4**
CO2	2	2	3	2	3	3	2	3	2	2	**2.3**
CO3	2	3	2	3	2	2	3	2	3	2	**2.4**
CO4	2	2	3	2	3	3	2	3	2	3	**2.5**
CO5	2	2	2	3	2	2	2	3	2	2	**2.2**
Mean Overall Score											**2.36 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UPH23CC02	**Core Couse - 2:** Mechanics	5	5

Course Objectives
To know the fundamentals of kinematics and dynamics of an object in different coordinate systems.
To understand the techniques for studying motion of an object in different systems
To apply the fundamental concepts of vector for solving complex problems in mechanics.
To identify the relation between velocity, acceleration, force and momentum for different physical systems and solving the problems related to conservation laws.
To analyse the concepts of the different forces acting on various physical systems.

UNIT I: Kinematics and Dynamics (15 Hours)

Kinematic equation - plane polar coordinates-circular motion and straight line motion – velocity and acceleration of a bead on a spoke - Newton's laws - Astronauts in space - applications of Newton's laws – astronaut's tug of war, Freight train - Constraints - wedge and block - masses and pulley - pulley system - Block on strings - The whirling rope - contact forces - block and string - Dangling rope - pulleys - tension and atomic forces - normal force and friction- block and wedge with friction.

UNIT II: Momentum (15 Hours)

System of particles - Bola, center of mass – drum major's baton, non-uniform rod, triangular sheet, conservation of momentum – Three body system, impulse -rubber ball rebound, force of impact with ground, flow of mass- spacecraft, freight car, rocket in free space and gravitational field, momentum transport to the surface.

UNIT III: Work and Energy (15 Hours)

Equation of motion in one dimension - mass thrown upward, simple harmonic oscillator - work energy theorem in one dimension - Vertical motion in an inverse square field - work energy theorem – escape velocity, Applying the work energy theorem - inverted pendulum- work done by a uniform force and central force - Potential energy - uniform force field, inverse square field - Energy diagrams - Non Conservative forces.

UNIT IV: Rotational Dynamics (15 Hours)

Angular Momentum - Particle, Sliding block and Conical pendulum, Torque - Sliding block and Conical pendulum, Fixed axis rotation, Moments of Inertia – uniform thin ring - uniform thin rod - circular disc, rotations about fixed axis, Atwood's machine, motion involving both translation and rotation - rolling wheel, disc on ice and drum rolling down a plane.

UNIT V: Gravitation and Central Force Motion (15 Hours)

Gravitational force, Potential energy and gravitational force due to spherical shell and solid sphere - Gravitational energy of a uniform sphere - Radius of an electron - Kepler's laws - Two body problem: Reduced mass.

Teaching Methodology	Demo Videos, PPT, Handouts, Study materials

Books for Study

1. Kleppner & Kolenkow. (2017). *An introduction to Mechanics*, (1st Ed.). McGraw-Hill.
2. Kittel, C., Knight, W., Helmholtz., Ruderman., & Moyer. (2017). *Mechanics*, (2nd Ed.). McGraw-Hill.

UNIT	BOOK	SECTIONS
I	1	1.7-1.9, 2.2, 2.4
II	1	3.1-3.6

III	1	4.2, 4.3, 4.5-4.7, 4.9, 4.11
IV	1	6.2-6.7
V	2	Ch 9 - P.No. 271-775, 276-279, 286-292

Books for Reference

1. Robert, R., Halliday, D., & Walker, J. (2015). *Principles of Physics*, (10th Ed.). John Wiley.
2. Feynman, R.P. (2012). *The Feynman lectures on Physics*, Pearson.
3. Irodov, I. E. (2016). *Problems in general Physics*, Arihant Publishers.

Websites and eLearning Sources*

1. https://www.youtube.com/@leokap
2. https://www.youtube.com/playlist?list=PLVOAwPuFGgdB4BvIJWAO_eq4uyAfNUdp4

(* subject to availability - not to be used for exam purpose)

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	acquire the knowledge on the concepts of kinematics and dynamics for the application of physics in real life physical problems.	**K1**
CO2	understand the concepts of motion for solving the problems related to conservation laws and rigid body dynamics.	**K2**
CO3	apply laws of motion and gravitation for understanding the complex problems in physics.	**K3**
CO4	analyze the relations between velocity, acceleration, force and momentum for different physical systems.	**K4**
CO5	evaluate the forces acting on various physics systems and problems related to conservation laws.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
2	**23UPH23CC02**			**Core Couse - 2:** Mechanics					**5**		**5**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	3	2	1	3	3	3	2	1	**2.3**
CO2	3	2	3	2	1	3	3	2	3	1	**2.3**
CO3	3	3	2	2	2	3	3	2	1	1	**2.2**
CO4	3	3	2	3	1	3	3	3	2	1	**2.4**
CO5	3	3	*3*	2	1	3	3	2	2	1	**2.3**
										Mean Overall Score	**2.3 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UPH23CP02	**Core Practical - 2:** Physics Practical - 2	3	2

Any 12 Experiments

1. Sonometer – frequency of the tuning fork – RD of solid.
2. Sonometer – AC frequency determination.
3. Spectrometer – refractive index - solid prism (glass).
4. Spectrometer – dispersive power - prism.
5. Potentiometer – internal resistance.
6. Potentiometer – low range voltmeter.
7. P.O Box – temperature coefficient.
8. Carey Fosters bridge – R and ρ (rho).
9. Convex lens – f, R and μ.
10. Concave lens – f, R and μ.
11. Field along the axis of a coil – deflection magnetometer.
12. M1/M2- Tan A & Tan B simultaneous method.
13. M1/M2 – Vibration magnetometer.
14. Air wedge -Thickness of wire.
15. Newton's rings.
16. B.G. – Figure of merit.
17. B.G. comparison of EMF's and capacitance.
18. Resonators - Helmholtz and Cylindrical Resonators.
19. g – by fall plate.
20. Specific heat by cooling method.
21. Specific heat capacity of solid by the method of mixture.

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UPH23WS01	BASIC WORKSHOP PRACTICE	3	1

1. Paper Weight
2. Pen Stand
3. Letter box
4. Wood Carving
5. Electroplating
6. Assembling the Extension board
7. Tube light assembling.
8. LED light assembling

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UPH23AC02	**Allied Course - 2:** Mathematics for Physics - 2	6	4

Course Objectives
To have knowledge on various numerical methods.
To have knowledge on solving partial differential equations.
To explore the knowledge on vector calculus in terms of Gradient - Divergence and Curl.
To have knowledge on expansion of trigonometry functions and hyperbolic functions.
To understand the concept of analytic functions.

UNIT I **(18 Hours)**

Simultaneous Linear Algebraic Equations - Gauss Elimination Method - Iteration Method: Gauss Seidel Method -Numerical Solution of O.D.E - Solution by Taylor's Methods - Euler's Method – Runge - Kutta Method (4th Order).

UNIT II **(18 Hours)**

Derivation of partial differential equations - By Elimination of Arbitrary Functions - Different Integrals of partial differential equations - Standard type of First Order Equations - Lagrange's Equation.

UNIT III **(18 Hours)**

Gradient - Divergence and Curl - Gauss Divergence Theorem - Green Theorem - Stokes Theorem (No proofs of theorem, only simple applications).

UNIT IV **(18 Hours)**

Expansion of $\sin n\theta$ and $\cos n\theta$ - Powers of Sines and Cosines of θ in terms of function of multiple of θ - Hyperbolic Functions - Inverse Hyperbolic Functions.

UNIT V **(18 Hours)**

Analytic function - Cauchy Riemann equations (No derivation, only simple applications) - Residues - Evaluation of definite integrals (Integral over the unit circle only).

Teaching Methodology	Lectures, Demonstrations.

Books for Study

1. Venkataraman, M.K. (2013). *Numerical Methods in Science and Engineering***.** The National Publishing Company, (5th Ed.).
   UNIT I: *Chapter IV (Sec: 2, 6), Chapter XI (Sec: 6, 10, 16).*
2. Narayanan,S., Rao, H.R., Pillay, T.K.M., & Kandaswamy. (2010). *Ancillary Mathematics Vol-II.*
   UNIT II: *Chapter 6 - Sec 1-6, pp: 252-274.*
   UNIT III: *Chapter 8 - Sec 1.16-1.20, 6, 7 and 9, pp: 335-350, 381-392, 399-405.*
3. Narayanan,S., Rao, H.R., Pillay, T.K.M., & Kandaswamy. (2009). *Ancillary Mathematics Vol-I.*
   UNIT IV: *Chapter 5 - Sec 5.1, 5.2 and 5.4, pp: 220-232, 242-256.*
4. Narayanan,S., Pillay, T.K.M. (1997). *Complex Analysis.*
   UNIT V: *Chapter 1 - Sec 11, pp: 43-57, Chapter 5 - Sec 1-3, (pp: 185-196).*

Books for Reference

1. Narayanan,S., Pillay, T.K.M. (2013). *Differential equations and its applications.* Viswanathan Pvt Ltd.
2. Venkataraman, M. K. (1986). *Higher Mathematics for Engineering and Science,* (3rd Ed.). The National Publishing Co.

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	have knowledge of basic concepts of numerical methods, partial differential equations, vector analysis, trigonometry and complex analysis.	**K1**
CO2	understand numerical methods, curl and divergence of a vector function, types of PDEs, series expansion, analyticity of a function.	**K2**
CO3	apply various methods in solving problems.	**K3**
CO4	illustrate with suitable examples.	**K4**
CO5	evaluate numerical solutions of ODE by numerical methods, PDEs, line, surface and volume integrals, series expansion, complex integration.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23UPH23AC02**			**Allied Course - 2:** Mathematics for Physics - 2						**6**	**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	3	2	1	3	3	1	2	3	**2.3**
CO2	3	3	2	1	2	3	3	2	2	2	**2.3**
CO3	3	2	3	1	2	2	3	2	3	2	**2.3**
CO4	3	2	3	1	2	3	2	1	2	3	**2.2**
CO5	3	3	3	2	2	2	3	1	2	3	**2.4**
										Mean Overall Score	**2.3 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UHE24VE02	**Value Education - 2:** Fundamentals of Human Rights	2	1

Course Objectives
To sensitize students about various human rights and their importance
To empower them with the right understanding of human rights
To enable them to understand the Fundamental rights and the duties in the constitution of India
To help them comprehend the background, principles and the articles of UDHR
To make them involved in activities to defend human rights

UNIT I: Human Rights - An Introduction **(6 Hours)**

Introduction- Classification of Human Rights- Scope of Human Rights-Characteristics of Human Rights - Challenges for Human Rights in the 21st Century.

UNIT II: Historical Development of Human Rights **(6 Hours)**

Human Rights in Pre-World War Era- Human Rights in Post-World War Era- Evolution of International Human Rights Law - the General Assembly Proclamation- Institution Building, Implementation and the Post- Cold War Period. The ICC.

UNIT III: India and Human Rights **(6 Hours)**

Introduction- Preamble to Indian Constitution - Classification of Fundamental Rights-Salient Features of Fundamental Rights-and Fundamental Duties.

UNIT IV: Human Rights of Women and Children **(6 Hours)**

Women's Human Rights- Issues related to women's rights - and Rights of Women's and Children

UNIT V: Human Rights Violations and Organizations **(6 Hours)**

Human Rights Violations - Human Rights Violations in India - the Human Rights Watch Report, January 2012- Human Rights Organizations – NHRC – SHRC.

Teaching Methodology	Chalk and Talk, Power point, Handouts and Group discussion

Book for Study

1. Department of Human Excellence, (2021). *Techniques of Social Analysis: Fundamentals of Human Rights.*

Books for Reference

1. Venkatachalem. (2005). *The Constitution of India*, *Giri Law House.*
2. Naik, V. & Shany, M. (2011). *Human rights education and training*, Crescent Publishing Corporation.
3. Neera, B. (2011). *Human Rights Content and Extent.* Swastika Publications.

Websites and eLearning Sources

1. https://www.un.org/en/universal-declaration-human-rights/
2. https://www.ilo.org/global/lang--en/
3. https://www.amnesty.org/en/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Identify the importance and the values of human rights	**K1**
CO2	Understand the historical background and the development of Human Rights and the related organizations	**K2**
CO3	Apply the provisions of National and International human rights to themselves and the society	**K3**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23UHE24VE02**			**Value Education - 2:** Fundamentals of Human Rights						**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	1	2	2	3	2	2	2	2	**2.1**
CO2	3	2	1	2	2	3	2	2	2	2	**2.1**
CO3	3	2	2	2	2	2	3	2	1	2	**2.1**
Mean Overall Score											**2.1 (Medium)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UHE24AE01	**Ability Enhancement Compulsory Course - 2:** Environmental Studies	2	1

Course Objectives
To enable students connect themselves with nature
To Impart knowledge of the concept of Biodiversity
To create awareness of the causes and consequences of various pollution
To help them recognize the available natural resources and the need to sustain them
To enable them to Identify the environmental problems and offer alternatives by making interventions both individually and collectively

UNIT I: Introduction to Environmental Studies **(6 Hours)**

Introduction – Scope and Importance – Subsystems of Earth – Various recycling Methods – Environmental Movements in India – Eco- Feminism – Public awareness – Suggestions to conserve environment

UNIT II: Natural Resources **(6 Hours)**

Food Resources – Land Resources – Forest resources – Mineral Resources – Water Resources – Energy Resources

UNIT III: Ecosystems, Biodiversity and Conservation **(6 Hours)**

General structure of ecosystem - Functions of Ecosystem - Energy flow and Ecological pyramids – Levels of Biodiversity - Hot spots of Biodiversity - Endangered and Endemic Species - Value of Biodiversity - Threats to Biodiversity - Conservation of Biodiversity

UNIT IV: Environmental Pollution **(6 Hours)**

Air Pollution – Water Pollution – Oil Pollution – Soil Pollution – Marine Pollution – Noise Pollution - Thermal Pollution – Radiation Pollution

UNIT V: Environmental Organizations and Treatise **(6 Hours)**

United Nations Environment Program (UNEP) - International treaties on Environmental protection - Ministry of Environment, Forest and Climate Change - Important National Environmental Acts and rules– Environmental Impact assessment - Issues deals with Population growth.

Teaching Methodology	Chalk and Talk, Power point and Field visit

Book for Study

1. Department of Human Excellence, (2021). *Environmental Studies.*

Books for Reference

1. Rathor, V.S. & Rathor B. S. (2013). *Management of Natural Resources for Sustainable Development*. Daya Publishing House.
2. Sharma P.D. (2010). *Ecology and Environment*, (8th Ed.). Rastogi Publications.
3. Agrawal, A & Gibson, C.C. (2001). *Introduction: The Role of Community in Natural Resource Conservation.* Rutgers University Press.

Websites and eLearning Sources

1. https://www.unep.org/
2. http://moef.gov.in/en/
3. https://www.ipcc.ch/reports/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Identify the concepts related to global ecology and the environment	**K1**
CO2	Comprehend the natural resources and environmental organizations	**K2**
CO3	Apply the acquired knowledge to sensitize individuals and public about the environmental crisis	**K3**

Relationship Matrix											
Semester	**Course Code**	**Title of the Course**								**Hours**	**Credits**
2	**23UHE24AE01**	**Ability Enhancement Compulsory Course - 2:** Environmental Studies								**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	1	2	2	3	2	2	2	2	**2.1**
CO2	3	2	1	2	2	3	2	2	2	2	**2.1**
CO3	3	2	2	2	2	2	3	2	1	2	**2.1**
Mean Overall Score											**2.1 (Medium)**