Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
III	*GEL*	***U24FTA301***	***TAMIL - III***	***60***	***3***	***25***	***75***	***100***

OBJECTIVES:

- தமிழர் வரலாற்றையும், வாழ்வியல் தொன்மையையும் அறிந்து கொள்ளுதல்
- தமிழரின் பண்பாட்டினை அறிந்து கொள்ளுதல் மற்றும் தமிழ்நாட்டிற்கு வந்திணைந்த பிற பண்பாட்டுச் சூழலை உணர்ந்து கொள்ளுதல்.
- மண் சார்ந்த சமூக ஆர்வலர்களையும் ஆளுமைகளையும் அறிதல்.

COURSE OUTCOME(S)

COs	CO Statement (After completing the course, the students will be able to)	Cognitive Level
CO1	தமிழக மற்றும் தமிழர் வரலாற்றை அறிந்து கொள்வர்	**K5**
CO2	தமிழரின் வாழ்வியல் நெறிமுறைகளை உணர்ந்து கொள்வர்	**K3**
CO3	தமிழகத்தின் வெவ்வேறு காலகட்டத்தின் ஆட்சி வரலாற்றை அறிவர்.	**K4**
CO4	தமிழ்ச் சூழலின் இன்றியமையாத காலகட்டங்களை உணர்ந்து கொள்வர்	**K2**
CO5	சமூகத்தின் மேம்பாட்டுக்கு உழைத்திட்ட மறுமலர்ச்சியாளகளைத் தெளிந்து கொள்வவர்.	**K1**

தமிழக வரலாறும் பண்பாடும் - பாடத்திட்டம்

அலகு - 1	**நில வரலாறு** 1. பழங்கால வரலாறு 2. திணை வாழ்வியல் 3. அகழ்வாராய்ச்சியில் தமிழர்	(12 Hours)
அலகு - 2	**சமூக வரலாறு** 1. சங்க கால ஆட்சிமுறை 2. அயல்நாட்டுத் தொடர்புகள் 3. கல்வியும் கலைகளும்	(12 Hours)
அலகு - 3	**ஆட்சியர் வரலாறு** 1. பல்லவர் மற்றும் நாயக்கர் ஆட்சி 2. முகமதியர் மற்றும் மராட்டியர் ஆட்சி 3. போர்த்துகீசியர் மற்றும் ஆங்கிலேயர் ஆட்சி	(12 Hours)
அலகு - 4	**தமிழக விடுதலைப் போராட்டம்** 1. விடுதலைப் போராட்டத்தில் தமிழகம் 2. இந்திய விடுதலையில் தமிழக இசுலாமியர் 3. மொழிப் போராட்டம்	(12 Hours)
அலகு - 5	**சமூக மறுமலர்ச்சியாளர்கள்** 1. நவாப் சி.அப்துல் ஹக்கீம் 2. டாக்டர் ஐடா ஸ்கடர் 3. டாக்டர் மு.வரதராசனார்	(12 Hours)

பார்வை நூல்கள்

1 செய்யுள் திரட்டு - தமிழ்த்துறை, சி.அப்துல் ஹக்கீம் கல்லூரி, 2025 சூன் வெளியீடு

2 தமிழக வரலாறும் தமிழர் பண்பாடும் - டாக்டர் ஆ.இராமகிருட்டினன்
சர்வோதய இலக்கியப் பண்ணை, மதுரை - 01
பத்தாம் பதிப்பு -2012

3 விடுதலைப் போரில் முஸ்லிம்கள் - வி.என்.சாமி
பாவலர் பதிப்பகம், மதுரை - 09
முதல் பதிப்பு -2009

Web Sources

- Tamil Heritage Foundation- www.tamilheritage.org
- Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
- Project Madurai - www.projectmadurai.org.
- Chennai Library- www.chennailibrary.com .
- Tamil Universal Digital Library- www.ulib.prg .
- Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com

Cos	Programme Outcomes					Programme Specific Outcomes					Mean
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	1	1	3	2	2	-	-	-	-	-	
CO2	1	2	2	3	3	-	-	-	-	-	
CO3	2	2	3	2	3	-	-	-	-	-	
CO4	3	2	2	2	3	-	-	-	-	-	
CO5	3	2	3	2	3	-	-	-	-	-	
Mean Overall Score											

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
IV	*GEL*	***U24FTA401***	***TAMIL - IV***	***60***	***3***	***25***	***75***	***100***

OBJECTIVES

- தமிழ் மொழியின் வழியாக அறிவியல் சிந்தனைகளை வளர்த்தல். தமிழ் இணைய பயன்பாட்டையும், அறிவியல் கலைச்சொல்லாக்கத்தையும் பயிற்றுவித்தல்.
- தமிழ்ச் சூழலில் அதிக பேசுபொருளாக இருக்கின்ற மொழி, பக்தி, நாட்டுநடப்பு மற்றும் நட்புறவு போன்றவற்றை மையப் பொருளாகக் கொண்டுள்ள தற்கால இலக்கியச் செய்திகளை விளங்க வைத்தல்.

COURSE OUTCOME(S)

COs	CO Statement (After completing the course, the students will be able to)	Cognitive Level
CO1	தமிழ்மொழியின் வழியாக அறிவியல் பற்றி சிந்திக்கும் திறன் பெறுவர்.	**K4**
CO2	தமிழிலக்கியப் பரப்பில் நிலம்,கருவி,உயிர் முதலியவை அறிவியலால் நிகழ்ந்த மாற்றங்களை நன்கு உணர்வர்.	**K5**
CO3	இணைய பயன்பாட்டையும், தமிழில் அதன் நிலைப்பாட்டையும், கலைச்சொல்லின் முக்கியத்துவத்தையும் தெரிந்து கொள்வர்.	**K3**
CO4	மொழி, இறையான்மை, நாட்டுநடப்புச் சூழல்களை தற்கால கவிதை வழி உணர்ந்து கொள்வர்	**K2**
CO5	வழிபாடு, நட்புறவு, நாட்டுப்பற்று போன்ற சூழ்நிலைகளைத் தமிழ் உரைநடை இலக்கியங்கள் வழி அறிவர்.	**K2**

தமிழில் அறிவியலும் சூழலியலும் - பாடத்திட்டம்

அலகு - 1	**தமிழரின் அறிவியல் சிந்தனைகள்** 1. ஐந்திணைப் பகுப்பும் சூழலியலும் 2. தொழில்நுட்ப மேலாண்மை 3. நீர் நில மேலாண்மை	(12 Hours)
அலகு - 2	**இலக்கியங்களில் அறிவியல் சிந்தனைகள்** 1. நிலவியல் 2. உலோகவியல் 3. உயிரியல்	(12 Hours)
அலகு - 3	**இணையத் தமிழ்** 1. இணையத் தமிழ் பயன்பாடு –அறிமுகம் 2. இணையத் தமிழ்க் கல்விக் கழகம், இணைய நூலகம் 3. கலைச்சொல்லாக்கம்	(12 Hours)
அலகு - 4	**தமிழ்ச் சூழலியல் (கவிதை)** 1. கவிஞர். முடியரசன் - மொழி உணர்ச்சி 2. கவிக்கோ அப்துல் ரகுமான் - தவறான எண் 3. ஈரோடு தமிழன்பன் - சென்ரியூ கவிதைகள்	(12 Hours)
அலகு - 5	**தமிழர் சூழலியல் (உரைநடை)** 1. தொ.பரமசிவம் - குலதெய்வம் 2. தி.மு.அப்துல் காதர் - முகத்தில் முகம் பார்க்கலாம் 3. வைரமுத்து - தாய்மண்	(12 Hours)

பார்வை நூல்கள்

1 செய்யுள் திரட்டு - தமிழ்த்துறை, சி.அப்துல் ஹக்கீம் கல்லூரி, 2025 சூன் வெளியீடு
2 அறிவியல் தமிழ் - இராதா செல்லப்பன், பாரதிதாசன் பல்கலைக்கழகம், திருச்சி.
3. இணையத்தமிழ் வரலாறு - மு.பொன்ன வைக்கோ பாரதிதாசன் பல்கலைக்கழகம்,திருச்சி.

Web Sources

- Tamil Heritage Foundation- www.tamilheritage.org
- Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
- Project Madurai - www.projectmadurai.org
- Chennai Library- www.chennailibrary.com
- Tamil Universal Digital Library- www.ulib.prg
- Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
- Tamil Books on line- books.tamil cube.com

Cos	Programme Outcomes					Programme Specific Outcomes					Mean
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	2	2	2	3	2	-	-	-	-	-	
CO2	2	2	3	2	2	-	-	-	-	-	
CO3	2	2	3	2	3	-	-	-	-	-	
CO4	2	2	3	2	3	-	-	-	-	-	
CO5	2	2	2	3	3	-	-	-	-	-	
Mean Overall Score											

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for Second Year UG Courses effective from the year 2025-2026

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
III	*GEL*	***U24FUR301***	***URDU - III***	***60***	***3***	***25***	***75***	***100***

Objectives:

Course Outcomes (COs) and Cognitive Level Mapping:

COs	CO Statement (After completing the course, the students will be able to)	Cognitive Level
CO1	**Understand the historical evolution of the Urdu language and different linguistic perspectives.**	**K2**
CO2	**Analyze the prose and poetry contributions of renowned Urdu writers and poets**	**K4**
CO3	**Gain insights into Urdu drama, its structure, significance, and evaluate**	**K5**
CO4	**Develop an appreciation for Rubaiyat by poets**	**K5**
CO5	**Improve formal letter-writing skills for academic, personal, and professional communication.**	**K6**

Cognitive Levels (K1-Remember**; K2-**Understand**; K3-**Apply**; K4-**Analyze**; K5-**Evaluate**; K6-**Create**)**

Syllabus:

UNIT – I - 15 Hours

Tareek-e-Adab-e-Urdu

Urdu Zaban Ki Ibteda-o-Irthiqa

Urdu Ke Muthaluq Mukthalif Nazriyath

UNIT – II - 15 Hours

Urdu Ke Nasar Nigaar aor shoura

Abdul Haleem Sharar

Prem Chand

Faiz Ahmed Faiz

Akbar Alihabadi

UNIT – III - 15 Hours

DRAMA

Darama Ka Tarruf

Kirshan Chender Ka Tarruf

Darwaz-e-Kholdo

UNIT – IV - 15 Hours

RUBAIYAT

Mir Anees ka tarruf

Gulshan Mein Phiroon Ke Sair Sehra

Dehkoon

Akbar Alahbadi ka tarruf

Gaflath Ki Hansi Se aah Bharna Achcha

Amjad Hyderadi ka tarruf

یونٹ -I

- تاریخ ادبِ اردو
- اردو زبان کی ابتداء و ارتقاء
- اردو کے متعلق مختلف نظریات

یونٹ -II

- اردو کے نثر نگار وشعرائ
- عبدالحلیم شرر
- پریم چند
- فیض احمد فیض
- اکبر الہ آبادی

یونٹ-III

- ڈرامہ
- ڈرامہ کا تعارف
- کرشن چندر کا تعارف
- دروازے کھول دو

یونٹ -IV

- رباعیات
- میر انیس کا تعارف
- گلشن میں پھروں کہ سیر صحرا دیکھوں
- اکبر الہ آبادی کا تعارف
- غفلت کی ہنسی سے آہ بھرنا اچھا
- امجد حیدرآبادی کا تعارف
- اس نام کی زندگی پہ کچھ جان تو ہو؟
- اصغر ویلوری کا تعارف
- ڈھونڈا تو کتابوں میں صداقت نہ ملی

یونٹ -V

- خطوط نگاری
- پرنسپل کے نام چھٹی کا خط
- والد/سرپرست کو خط، جس میں کالج کی فیس کی ادائیگی کے لیے رقم مانگی گئی ہو۔

Is Nam Ki Zandagi Pe Kuch Jan Tho Ho **✾✾Asghar Vellori ka tarruf** **Doonda Tho Kithaboon Mein Sadaqth na Mili** **UNIT – V - 15 Hours** **✾✾Khutoot Nigari** **✾✾Letter to the Principal seeking leave** **✾✾Letter to the Father/Guardian asking money for payment of College fees** **✾✾Letter to the Manager of a Firm seeking employment** **✾✾ Letter to a publisher or book seller placing order for books**	❖ ملازمت کی درخواست کرتے ہوئے مینیجر کے نام خط ❖ کتابوں کا آرڈرکرتے ہوئے پبلشر یا کتاب فروش کے نام خط

 # _____# Self Study Component for Seminar/Assignment:
(Questions should not be asked from self study component in the End Semester Examinations)

Text Books:

NISAB-E-JAMEEL EDITED BY Dr.S.MOHAMED YASSIR & Dr.S.MOHAMED MUDDASSIR

Reference Book:

- Deewan-e-Meer
- Deewan-e-Dard
- Deewan-e-Ghalib
- Kuliyath-e-Momin
- Kuliyath-e-Akbar
- Kuliyath-e- Iqbal
- Kuliyath-e- Jigar
- Kuliyath-e- Saher Ludhyanvi

Web Resources:

1. www.rekhta.org **2.** www.urduchannel.in **3.** www.urducouncil.nic.in

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2							
CO2	2	3	3	2							
CO3	3	2	3	3							
CO4	3	2	2	2							
CO5	3	3	2	3							

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
IV	*GEL*	***U24FUR401***	***URDU - IV***	***90***	***3***	***25***	***75***	***100***

Objectives:

Course Outcomes (COs) and Cognitive Level Mapping:

COs	CO Statement (After completing the course, the students will be able to)	Cognitive Level
CO1	Understand the fundamentals of Short Story, its definition, and artistic elements.	**K2**
CO2	Analyze and critically appreciate selected works of renowned Urdu fiction	**K4**
CO3	Evaluate the themes, social contexts, and narrative styles of selected Afsanas	**K5**
CO4	Develop critical thinking through Afsanas	**K5**
CO5	Enhance literary expression through general essays and dialogue-writing skills	**K6**

Cognitive Levels (K1-Remember**; K2-**Understand**; K3-**Apply**; K4-**Analyze**; K5-**Evaluate**; K6-**Create**)**

Syllabus:

UNIT – I -- 15 Hours

- **AFSANA**
- Afsane ki Tareef
- Afsane ka fun

UNIT – II -- 15 Hours

- Rajendra Singh Bedi ka tarruf
- Afsana-Bhola
- Prem Chand ka Tarruf
- Afsana- Kafan

UNIT – III -- 15 Hours

- Kirshan Chender ka Tarruf
- Afsana- Jamun Ka Pard
- Ameerunisa ka Tarruf
- Afsana-Dard Ka Ehsaas

UNIT – IV -- 15 Hours

- Ali Akbar Amburi ka Tarruf
- Afsana-KhushNaseeb
- Saadat Hasan Manto ka Tarruf
- Naya Qanoon

UNIT – V -- 15 Hours

- MAZMOON NIGARI
- Mazmoon Nigari Ki Tareef
- Akbaar Bini ke fawaid
- Computer ki Ahmiyath
- Science ke fawaid aur Nuqsanath
- Mukalama Nigari

یونٹ -I

- □ □افسانہ
- □□افسانے کی تعریف
- □□افسانے کا فن

یونٹ - II

- □□راجندر سنگھ بیدی کا تعارف
- □□افسانہ -بھولا
- □□پریم چند کا تعارف
- □افسانہ- کفن

یونٹ -III

- □□کرشن چندر کا تعارف
- □□افسانہ- جامن کا پیڑ
- □□امیرالنساء کا تعارف
- □افسانہ -درد کا احساس

□یونٹ -IV

- □□علی اکبر آمبوری کا تعارف
- □□افسانہ- خوش نصیب
- □□سعادت حسن منٹوکا تعارف
- □افسانہ -نیا قانون

یونٹ -V

- □مضمون نگاری
- مضمون نگاری کی تعریف
- اخبار بینی کے فوائد
- □کمپیوٹر کی اہمیت
- □ سائنس کے فوائد اور نقصانات
- مکالمہ نگاری

 # _____# Self Study Component for Seminar/Assignment:
(Questions should not be asked from self study component in the End Semester Examinations)

Text Books:

NISAB-E-JAMEEL EDITED BY Dr.S.MOHAMED YASSIR & Dr.S.MOHAMED MUDDASSIR

Reference Book:

- Deewan-e-Meer
- Deewan-e-Dard
- Deewan-e-Ghalib
- Kuliyath-e-Momin
- Kuliyath-e-Akbar
- Kuliyath-e- Iqbal
- Kuliyath-e- Jigar
- Kuliyath-e- Saher Ludhyanvi

Web Resources:

1. www.rekhta.org **2.** www.urduchannel.in **3.** www.urducouncil.nic.in

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3
CO1	3	3	3	2							
CO2	2	3	3	2							
CO3	3	2	3	3							
CO4	3	2	2	2							
CO5	3	3	2	3							

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by

Syllabus for All II Year UG Courses effective from the year 2025-2026

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
III	*GEL*	***U24FEN301***	***English – III***	***60***	***3***	***25***	***75***	***100***

Course Objectives

CO1	To enable learners to acquire self-awareness required in various life situations.
CO2	To enable learners to inculcate positive thinking required in various life situations.
CO3	To help them acquire the attribute of empathy
CO4	To assist them in acquiring creative and critical thinking abilities
CO5	To enable them to learn the basic grammar

Unit I

Prose

1. My Vision for India – Dr. A.P.J. Abdul Kalam
2. On Saying Please – A.G. Gardiner
3. Character is Destiny – Dr. S. Radhakrishnan
4. Time and the Machine – Aldous Huxley

Unit II

Poetry

1. The Daffodils — William Wordsworth
2. Ulysses – Alfred Lord Tennyson
3. The Village School Master—Oliver Goldsmith
4. Telephone Conversation – Wole Soyinka

Unit III

Short Story

1. Three Questions – Leo Tolstoy
2. The Taxi Driver – K.S.Duggal

Unit IV

Readers Theatre

1. The Boy Comes Home – A.A. Milne
2. Love at First Sight – The Tempest – William Shakespeare

Unit V

Lexical Skills

a) Foreign Words and Special Terminology
b) Building Vocabulary
c) Phrasal Verbs
d) Idioms and Phrases

Grammar

a) Adverbs and its kinds
b) Gerund, Participle, Infinitive
c) Tenses – Introduction
d) Present Tense
e) Past Tense
f) Active and Passive Voices
g) Direct and Indirect Speeches

Communication Skills (LSRW)

a) Expressing Sympathy
b) Expressing Gratitude
c) Complaining
d) Apologizing

Composition

a) Public Speaking
b) Seminar
c) Writing a Memorandum
d) Expansion of Proverbs

Prescribed Book: New Vistas in English - III, Board of Editors, Published by Hakeem Publications, Department of English, C. Abdul Hakeem College (Autonomous), Melvisharam-632509. www.cahc.ac.in, Mail: hakeemcollege@edu.in

Web Resources

1.	Telephone Conversation - Wole Soyinka https://www.k-state.edu/english/westmank/spring_00/SOYINKA.html
2.	https://www.litcharts.com/poetry/alfred-lord-tennyson/ulysses
3.	https://www.litcharts.com/poetry/sarojini-naidu/the-gift-of-india
4.	https://onlinefreenotes.com/on-saying-please/
5.	https://sxlearningenglish.blogspot.com/2021/05/neb-grade-xi-three-questions-leo-tolstoy.html
6.	https://www.xjd.com/t-the-taxi-driver-by-kartar-singh-duggal-summary/?srsltid=AfmBOooteYGglXTMpB5PyBIDdNpxxxRY3ylETvzURDpoKydTS_KZxuaB

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
IV	*GEL*	***U24FEN401***	***English – IV***	***60***	***3***	***25***	***75***	***100***

Course Objectives

CO1	To facilitate self-awareness for handling diverse life situations.
CO2	To cultivate positive thinking skills for various life scenarios.
CO3	To develop empathy as a core attribute.
CO4	To nurture creative and critical thinking abilities.
CO5	To apply acquired grammar knowledge to improve the quality and effectiveness.

Unit I

Prose

1. On Forgetting—Robert Lynd
2. The Face of Judas Iscariot – Bonnie Chamberlin
3. The Eternal Silence of These Infinite Crowds - Nirad C. Chauduri
4. The Gift of Language — J.G.Bruton

Unit II

Poetry

1. Anxiety Monster- Rhona McFerran
2. A River- A.K. Ramanujan
3. La Belle Dame Sans Merci—John Keats
4. I Know Why the Caged Bird Sings – Maya Angelou

Unit III

Short Story

1. Valiant Vicky, The Brave Weaver - Flora Annie Steel
2. A Retrieved Reformation – O Henry

Unit IV

Reader's Theatre & Extract from a play

1. The Quality of Mercy (Trial Scene from the Merchant of Venice)
2. The Giant's Wife a Tall Tale of Ireland – William Carleton

Unit V

Lexical Skills:

a) Common Errors in English
b) Formation of words
c) Spelling and Sound: Introduction to Phonetics
d) Vowels and Consonants

Grammar:

a) Conjunction and its kinds

b) Interjection and its kinds

c) Regular and Irregular Verbs

d) Future Tense

e) Degrees of Comparison

f) Simple, Complex and Compound Sentences

Communication Skills (LSRW):

a) Phoning

b) Offering Help

c) Asking for Information

d) Making an Appointment

Composition:

a) Designing a Resume and Curriculum Vitae

b) Writing covering letter for Resume & CV

c) Preparing Agenda for Meetings

d) Writing Minutes of Meetings

Prescribed Book: New Vistas in English - IV, Board of Editors, Published by Hakeem Publications, Department of English, C. Abdul Hakeem College (Autonomous), Melvisharam-632509. www.cahc.ac.in, Mail: hakeemcollege@edu.in

Web Resources

1	https://www.orwellfoundation.com/the-orwell-foundation/orwell/essays-and-other-works/why-i-write/
2	https://www.litcharts.com/lit/a-retrieved-reformation/summary-and-analysis https://study.com/academy/lesson/a-retrieved-reformation-summary-themes.html
3	https://www.poetrysoup.com/poem/anxiety_monster_1100885
4	https://allpoetry.com/A-River https://writerjyotijha.medium.com/river-a-k-ramanujan-775dcc791a5e
5	https://www.savemyexams.com/igcse/english-literature/edexcel/16/revision-notes/poetry-anthology/part-3-pearson-edexcel-international-gcse-english-anthology/la-belle-dame-sans-merci/
6	https://www.folger.edu/explore/shakespeares-works/the-merchant-of-venice/read/4/1/

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
III	*CC*	***U24MPH301***	***Mechanics***	***75***	***5***	***25***	***75***	***100***

Course Objectives:
This course allows the students: To have a basic understanding of the laws and principles of mechanics, visualize conservation laws then apply Lagrangian and Hamiltonian equation to solve complex problems.

Course Outcomes (COs) and Cognitive Level Mapping

COs	CO Statement (After completing the course, the students will be able to)	Cognitive Level
CO1	Acquire the knowledge on the conservation laws	K2
CO2	Connect the various conservation laws and identify its applications	K3
CO3	Apply the knowledge of rigid body dynamics to solve the problems based on this concept.	K4
CO4	Analyze the dynamics of mechanical systems using the Lagrangian formulation.	K5
CO5	**Develop problem-solving skills using** Hamiltonian Mechanics	K5

Cognitive Levels (K1-Remember**; K2-**Understand**; K3-**Apply**; K4-**Analyze**; K5-**Evaluate**; K6-**Create**)**

UNIT I: CONSERVATION LAWS OF ENERGY 15 hours

Introduction – Significance of conservation laws – Concepts of work, power and energy – Conservative forces – Kinetic energy – Potential energy – Law of conservation of mechanical energy – Potential energy in an electric field – Non-conservative forces.
Gravitation: Newton's law of gravitation – Determination of G by Boy's method – Density of earth – Mass of the earth and sun – Gravitational potential – Escape velocity.

UNIT II: CONSERVATION LAWS OF LINEAR AND ANGULAR MOMENTUM 15 hours

Conservation of linear momentum – Centre of mass – Equation of motion of centre of mass – Collision – Elastic and inelastic collision – Calculation of final velocities of colliding particles – System with variable mass-The rocket – Multi stage rocket – Angular momentum – Conservation of angular momentum – Motion of a planet in an elliptical orbit around the sun – Proton scattering by heavy nucleus – Shape of galaxy.

UNIT III: RIGID BODY DYNAMICS 15 hours

Rigid Body – Translational and rotational motion – Torque – Angular momentum – Moment of Inertia (M.I.) – Radius of gyration – Analogy between translational and rotational motion – Perpendicular axes theorem – Parallel axes theorem – M.I. of a thin uniform rod – M.I. of a rectangular bar – M.I. of a circular ring – M.I. of a solid cylinder – Kinetic energy of rotation – Body rolling along a plane surface – Body rolling down an inclined plane – Precession – Gyrostat – Gyrostatic applications.

UNIT IV: LAGRANGIAN MECHANICS 15 hours

Mechanics of a system of particles – Degrees of freedom – Constraints – Generalized coordinates – Generalized notations – Configuration space – Principle of virtual work and D' Alembert's Principle – Lagrange's equation from D' Alembert's principle – Applications – Atwood's machine – Simple pendulum – Compound pendulum – Linear harmonic oscillator.

UNIT V: HAMILTONIAN MECHANICS 15 hours

Phase space – Hamiltonian function – Hamilton's canonical equations of motion – Physical significance of the Hamiltonian function – Hamilton's variational principle – Applications of Hamilton's equations of motion – Linear harmonic oscillator – Simple pendulum - Compound pendulum.

Text Books:

1. D.S. Mathur and P.S. Hemne, Mechanics, Revised Edition 2012, S.Chand & Co pvt. Ltd.
2. R. Murugeshan, Kiruthiga sivaprasath, Modern physics, S. Chand & co pvt. Ltd.
3. Brij Lal and Subrahmanyam,
4. P. DuraiPandian, Laxmi Durai Pandian, MuthamizhJayapragasam, 2005, Mechanics, 6threvised edition, S. Chand and Co.
5. J.C. Upadhyaya, 2019, Classical Mechanics, Himalaya Publishing house, Mumbai.

Reference Books:

1. Goldstein Herbert, 1980, Classical Mechanics. U.S.A: Addison and Wesley.
2. Halliday, David and Robert, Resnick, 1995, Physics Vol.I. New Age, International, Chennai.
3. Halliday, David Robert Resnick and Walker Jearl, 2001, Fundamentals of Physics, John Wiley, New Delhi.
4. R. Murugeshan, Mechanics and mathematical physics, S. Chand & Co pvt. Ltd.

Web Resources:

1. https://youtu.be/X4_K-XLUIB4
2. https://nptel.ac.in/courses/115103115
3. https://www.youtube.com/watch?vp075LPq3Eas
4. https://www.youtube.com/watch?v==mH_pS6fruyg
5. https://onlinecourses.nptel.ac.in/noc22_me96/preview
6. https://www.youtube.com/watch?v=tdkFc88Fw-M
7. https://onlinecourses.nptel.ac.in/noc21_me70/preview

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	Mean
CO1	2	3	3	2	2	3	3	2	3	2.55
CO2	2	3	3	2	2	3	3	3	3	2.66
CO3	3	3	3	1	2	2	3	3	3	2.55
CO4	2	2	1	1	1	1	2	2	3	1.66
CO5	2	2	2	1	2	1	2	2	3	1.88
Mean										2.26

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by
Dr. S. FATHHOOR RABBANI	Mr. J. FAYAJUL ARIFEEN

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
III	*CC*	***U24MPHP31***	***Practical - III***	***45***	***3***	***25***	***75***	***100***

Objectives:
Aim to help in estimating physical properties such as the elastic, mechanical, electric and optical properties of different materials using scientific instruments.

Course Outcome (COs) and Cognitive level Mapping

COs	**CO Statement** (After completing the course, the students will be able to)	**Cognitive Level**
CO1	Understand and evaluate the Young's modulus and Rigidity modulus of the given material	K2
CO2	Analyse the electrical parameters like resistance using potentiometer	K3
CO3	Apply the basic principles of optics to determine the refractive index of the material of prism	K4
CO4	Understand and analyse the characteristics of electronic devices such as diodes and transistors	K4
CO5	Skill Development-Practical exposure	K5

Cognitive Levels (**K1**- Remember; **K2**- Understand; **K3**-Apply; **K4**- Analyse; K- Evaluate; **K6**-Create)

(Any 8 Experiments)

1. Young's modulus uniform bending Pin and microscope.
2. Bifilar pendulum – Determination of M. I. of a rectangular body.
3. Surface Tension of a liquid - Capillary rise method.
4. Sonometer – AC frequency – Brass wire.
5. Spectrometer – Refractive index of a prism – i-d curve.
6. Air wedge – thickness of a thin wire.
7. Carey Fosters bridge – Temperature coefficient of resistance.
8. Potentiometer-calibration of high range voltmeter
9. Conversion of Galvanometer into Voltmeter (0-3 V) and Ammeter (0-15 mA)
10. B.G. - Internal resistance of a cell
11. B.G. - Figure of merit - Charge Sensitivity
12. Characteristics of a transistor – Common Emitter mode

Books for study:

1. A Text book of Practical Physics, M.N.Srinivasan, S.Balasubramanian and R.Renganathan, Sultan Chand & Sons, New Delhi, 2005.
2. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics- S. Viswanathan PublisherPart I 1990
3. C.C Ouseph, C.Rangarajan, R.Balakrishnan- A Text Book of Practical Physics- S.Viswanathan Publisher-Part II (1996)
4. A Laboratory course in Electronics, T. Ramalingom and P. Raghupalan, Oxford & IBH Publishing co. New Delhi
5. A text book of practical Physics, M.N. Srinivasan, Sultan Chand & Sons, New Delhi
6. Practicals Physics,- St. Joseph's college, Trichy
7. http://practicalphysics.org/

Book for reference:

S.L Gupta and V.Kumar- Practical Physics- Pragati Prakashan – 25th Edition (2002)

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
III	*SEC*	***U24SPH301***	***Mathematical Physics (SBS - IV)***	***30***	***2***	***25***	***75***	***100***

Objectives: To understand higher mathematical concepts which are applied to solve problems in Physics and similar situations.

Course Outcomes (COs) and Cognitive Level Mapping

COs	**CO Statement** (After completing the course, the students will be able to)	**Cognitive Level**
CO1	Identify the different types of matrices and acquire knowledge on the process of diagonalization	K1
CO2	Understand the concepts and techniques of differential and integral vector calculus	K2
CO3	Obtain expressions for differential operators and unit vectors in terms of spherical polar coordinates	K3
CO4	Apply the Fourier series and Fourier Transform and solve physical problems	K4
CO5	Analyze the mathematical solutions using partial differential equations for vibrating string and heat flow equation	K5

Cognitive Levels (K1-Remember**; K2-**Understand**; K3-**Apply**; K4-**Analyze**; K5-**Evaluate**; K6-**Create**)**

UNIT I: MATRICES 6 Hours

Special types of matrices: Symmetric, Hermitian, orthogonal and unitary matrices – Similarity transformation – Eigen values and Eigen vectors – Characteristic equation of a matrix – Cayley-Hamilton theorem – Inverse of matrix by Cayley-Hamilton theorem – Diagonalization of matrices.

UNIT II: VECTORS 6 Hours

Differentiation of vectors – Gradient and its physical interpretation – Line, surface and volume integrals – Divergence, Curl and their physical significance – Important vector identities – Statement, proof and simple problems for Gauss's divergence theorem – Poisson's and Laplace's equations – Statements for Stoke's and Green's theorems.

UNIT III: ORTHOGONAL CURVILINEAR COORDINATES 6 Hours

Orthogonal curvilinear coordinates – Gradient, divergence, Laplacian, curl in terms of orthogonal curvilinear coordinates – Spherical polar coordinates and their differential operators – Unit vectors in spherical polar coordinates.

UNIT IV: FOURIER SERIES AND FOURIER TRANSFORMS 6 Hours

Fourier Series and their coefficients – Even and odd functions – Dirichlet's conditions – Half range *(0 to π)* cosine and sine series – Change of length of interval *(-l,l)* – Application of Fourier series to square wave, saw-tooth wave.

Fourier Transform – Infinite Fourier sine and cosine transforms – Properties of Fourier transform.

UNIT V: APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS (PDE) 6 Hours

Equation of motion for the vibrating string – D' Alembert's and Fourier series solutions.

One dimensional heat flow equation – Solution by method of separation of variables – Solution by boundary conditions and initial conditions.

Books for Study:

4. Mathematical Physics – Satya Prakash, 7th Edition, Sultan Chand & Sons, New Delhi, 2021.
5. Mathematical Physics – B. D. Gupta, 4th Edition, Vikas Publishing House Pvt. Ltd., 2010.
6. Mathematical Physics – H. K. Das, S. Chand & Co, New Delhi.
7. Advanced Engineering Mathematics, Erwin Kreyszig, 2008, Wiley India.
8. Mathematical Physics – P. K. Chattopadhyay, New Age International Publishers.

Books for Reference:

1. Fourier Analysis by M.R. Spiegel, 2004, Tata McGraw-Hill.
2. Engineering Mathematics III- B, M. K. Venkataraman,
3. Applied Mathematics for Scientists and Engineers, Bruce R. Kusse & Erik A. Westwig, 2nd Ed, WILEY-VCH Verlag, 2006.
4. Vector space & Matrices – J. C. Jain, Narosa Publishing House Pvt. Ltd.

Web Resources:

1. https://www.geogebra.org/
2. https://mathworld.wolfram.com/
3. https://swayam.gov.in/explorer?category=Mathematics
4. https://ocw.mit.edu/search/?d=Mathematics

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	Mean
CO1	3	3	2	1	1	1	2	1	3	1.9
CO2	3	2	3	1	1	1	3	1	3	2.0
CO3	3	3	2	1	1	1	3	1	3	2.0
CO4	2	3	3	1	1	1	3	1	3	2.0
CO5	3	3	3	2	1	1	3	1	3	2.2
Mean Overall Score										**2.0**

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by
Mr. J. FAYAJUL ARIFEEN	Mr. J. FAYAJUL ARIFEEN

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
IV	*CC*	***U24MPH401***	***Optics and Spectroscopy***	***75***	***5***	***25***	***75***	***100***

Objectives:
To understand the concept of various aberrations in lenses and prisms, phenomenon like interference, diffraction, polarization through wave nature of light and its applications and to gain knowledge in spectroscopy.

Course Outcomes (COs) and Cognitive Level Mapping

COs	**CO Statement** (After completing the course, the students will be able to)	**Cognitive Level**
CO1	Knowledge on the geometrical optics and different properties of wave optics	K1
CO2	Describe the different properties of light waves and spectroscopy technique	K2
CO3	Express the impotence of light wave phenomenon and spectroscopy technique	K3
CO4	Identify the concept of light properties used in various optical instruments	K4
CO5	Construct the optical instrument for the measurement of wavelengths and resolving powers.	K5

Cognitive Levels (K1-Remember**; K2-**Understand**; K3-**Apply**; K4-**Analyze**; K5-**Evaluate**; K6-**Create**)**

UNIT I: GEOMETRICAL OPTICS 15 hours

Lens – Spherical aberration in lenses – Methods of minimizing spherical aberration – condition for minimizing spherical aberration – Aplanatic lens – chromatic aberration in lenses – condition for achromatism of two thin lenses (in and out of contact) – Coma – Astigmatism and its minimization – Eye piece – Huygens's and Ramsden' eyepieces – Dispersion through a prism – Achromatism in prism – Combination of prisms to produce i) deviation without dispersion ii) dispersion without deviation.

UNIT II: INTERFERENCE 15 hours

Introduction – Conditions for interference – Wedge shaped thin film – Determination of diameter of a thin wire by Air wedge – Test for optical flatness – Newton's rings by reflected light – Determination of wavelength of sodium light – Michelson's Interferometer – theory and its Application (Measurement of wavelength) – Jamin's interferometer – determination of refractive index of gases.

UNIT III: DIFFRACTION 15 hours

Introduction – Fresnel's diffraction – Rectilinear propagation of light – Zone plate (Principle, construction and theory) – Diffraction at circular aperture – Fraunhofer diffraction at single slit, Double slit – Plane diffraction grating – Theory of plane transmission grating - Experiment to determine wavelength (Normal incidence method) – Resolving power – Rayleigh's criterion for resolution – Resolving powers of prism and grating.

UNIT IV: POLARISATION 15 hours

Double refraction – Huygens's theory of double refraction in uniaxial crystals – Nicol Prism as polarizer and analyzer – Theory of Plane, circularly and elliptically polarized lights – Quarter wave plates and Half wave plates – Production and detection of plane, circularly and elliptically polarized light – Optical activity – Fresnel's explanation of optical activity – Specific rotatory power – Laurent's half shade polarimeter.

UNIT V: SPECTROSCOPY 15 hours

Types of spectra – Infrared (IR) spectroscopy – Sources and detector – Uses – ultraviolet (UV) spectroscopy – Sources – Quartz spectrograph – Applications – Raman Spectroscopy – Quantum theory of Raman effect – Applications – Nuclear magnetic resonance (NMR) – Nuclear quadrupole resonance (NQR) – Electron spin resonance spectroscopies (ESR) (Qualitative study).

Text Books:

1. Optics and Spectroscopy – R. Murugeshan and Kiruthiga Sivaprasath, S.Chand and Co., New Delhi. 6th revised edition, 2008.
2. A text book of Optics – Subramanyam and Brijlal, S. Chand and co.., 25 Edition, New Delhi 2004.
3. Elements of Spectroscopy – S.L. Gupta, V.Kumar and R. C. Sharma Pragati Prakashan, 13 Editions, Meerut, 1997.
4. Molecular structure and spectroscopy – G. Aruldhass, PHI Pvt Ltd, , IIth Edition, New Delhi, 2007.

Reference Books:

1. Optics – Sathyaprakash, Ratan Prakashan Mandhir, VII Edition, New Delhi, 1990.
2. Introduction to Molecular Spectroscopy –C.N.Banewell, TMH publishing co. IV Edition, New Delhi, 2006.
3. Ajoy Ghatak, Optics, (TMH), New Delhi, Fourth edition, 2009.
4. Singh & Agarwal, Optics and Atomic Physics, Pragati Prakashan Meerut, Nineth edition, 2002.
5. Fundamentals of Physics, by D.Halliday, R. Resnick and J. Walker, Wiley, 6thEdition, New York (2001).

e-Resources:

5. https://www.youtube.com/watch?v=UZdTAvANKB0
6. https://www.youtube.com/watch?v=kBDmOjjJdes&list=PLn6POeOJkCuIKhOJJjkHx_975ljHLExPC&index=2
7. https://www.youtube.com/watch?v=VBYthqYv8mU&list=PLn6POeOJkCuIKhOJJjkHx_975ljHLExPC&index=3
8. https://www.youtube.com/watch?v=DjnDX28l4xA

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	Mean
CO1	2	1	1	2	2	2	3	2	2	1.88
CO2	2	2	3	2	2	3	2	3	3	2.44
CO3	2	2	3	3	2	3	2	3	3	2.55
CO4	2	2	3	3	2	3	2	3	3	2.55
CO5	3	3	3	3	2	3	2	3	3	2.77
Mean										**2.43**

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by
Dr. S MUNAWAR BASHA	Mr. J. FAYAJUL ARIFEEN

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
IV	*CC*	***U24MPHP41***	***Practical – IV***	***45***	***3***	***25***	***75***	***100***

Objectives:
Apply several physics concepts to understand properties of matter, heat, sound waves, characteristics of electronic devices, set up experimentation to verify theories and interpret the results.

Course Outcome (COs) and Cognitive level Mapping

COs	**CO Statement** (After completing the course, the students will be able to)	**Cognitive Level**
CO1	Understand and evaluate the Young's modulus and Rigidity modulus of the given material	K2
CO2	Analyse the electrical parameters like resistance using potentiometer	K3
CO3	Apply the basic principles of optics to determine the refractive index of the material of prism	K4
CO4	Understand and analyse the characteristics of electronic devices such as diodes and transistors	K4
CO5	Skill Development-Practical exposure	K5

Cognitive Levels (**K1**- Remember; **K2**- Understand; **K3**-Apply; **K4**- Analyse; K- Evaluate; **K6**-Create)

(Any 8 Experiments)

1. Young's modulus uniform bending Scale and Telescope.
2. Rigidity modulus – Static Torsion.
3. Viscosity of highly viscous liquid by Stoke's method.
4. Sonometer – Specific gravity of solid and liquid.
5. Spectrometer – Refractive index of a prism – *i-i'* curve.
6. Spectrometer – Grating – Normal incidence – Determination of wavelength.
7. Specific heat capacity of a solid – Method of mixtures.
8. Potentiometer – Calibration of high range ammeter.
9. Potentiometer – resistance and specific resistance of a wire.
10. BG – Absolute capacitance of a capacitor.
11. Field along the axis of a coil – Deflection Magnetometer – Determination of m and B_H.
12. Zener diode – Voltage regulation.

Books for study:

1. A Text book of Practical Physics, M.N.Srinivasan, S.Balasubramanian and R.Renganathan, Sultan Chand & Sons, New Delhi, 2005.
2. C.C Ouseph, G.Rangarajan- A Text Book of Practical Physics- S. Viswanathan PublisherPart I 1990.
3. C.C Ouseph, C.Rangarajan, R.Balakrishnan- A Text Book of Practical Physics- S.Viswanathan Publisher-Part II (1996).
4. A Laboratory course in Electronics, T. Ramalingom and P. Raghupalan, Oxford & IBH Publishing co. New Delhi.
5. A text book of practical Physics, M.N. Srinivasan, Sultan Chand & Sons, New Delhi.
6. Practicals Physics,- St. Joseph's college, Trichy.

Book for reference:

1. S.L Gupta and V.Kumar- Practical Physics- Pragati Prakashan – 25th Edition (2002).

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
IV	*SEC*	***U24SPH401***	***Fundamentals of Computers (SBS - V)***	***30***	***2***	***25***	***75***	***100***

Objectives: The primary goal is to understand about our universe and its existence based on different theories and to look deeper into our planets and in particular about the sun.

Course Outcomes (COs) and Cognitive Level Mapping

COs	CO Statement	Cognitive Level
CO1	Understand the different types of input and output devices and their functionalities.	K2
CO2	Compare and contrast various input devices such as keyboard, mouse, joystick, and scanner.	K4
CO3	Analyze the working principles, advantages, and limitations of output devices like monitors, printers, and speakers.	K4
CO4	Evaluate the role of input and output devices in enhancing user interaction with computers.	K5
CO5	Apply knowledge of input and output devices in selecting appropriate peripherals for specific computing tasks.	K3

Cognitive Levels (K1-Remember**; K2-**Understand**; K3-**Apply**; K4-**Analyze**; K5-**Evaluate**; K6-**Create**)**

Unit 1: History and Evolution of Computers 6 hours

History of Computers - The Origins of Computing - Generations of Computers - First Generation: Vacuum Tubes - Second Generation: Transistors - Third Generation: Integrated Circuits - Fourth Generation: Microprocessors - Fifth Generation (Present and Beyond): Artificial Intelligence.

Unit 2: Components of Computer System 6 hours

Central Processing Unit (CPU) - Memory Units (Primary and Secondary).
Input Devices: Keyboard: Types of keyboards, Types of Keys – Mouse: Uses, Parts, Types – Joystick: Types, Parts, Advantages & Disadvantages - Light Pen: Characteristics, Uses, Types – Scanner: Working Principle, Types.
Output Devices: Speakers: Applications, Parts, working – Printers: History, Types, Advantages & Disadvantages – Monitors: Working, Types, Advantages & Disadvantages.

Unit 3: Computer Hardware 6 hours

Motherboard: Features and Functions - CPU: Functions and Program Execution - Difference between ALU and CPU - Memory: Random Access Memory (RAM) – Types of RAM - Read-Only Memory (ROM) – Similarities with RAM - Hard Disk Drives (HDD) Vs Solid State Drives (SSD) - Graphics Processing Unit (GPU) - Power Supply Unit (PSU).

Unit 4: Computer Software 6 hours

History and Evolution of Computer Software - Types of Computer Software - System Software - Application Software - Utility Software – Working of computer software - Software Distribution Methods - Comparison of Hardware and Software - Security in Computer Software.

Unit 5: Microsoft Office Tools 6 hours

Introduction to Word Interface : Creating and Formatting Documents - Working with Tables and Lists - Using Styles and Templates - Inserting Images, Shapes, and Charts - Page Layout and Printing Options - Mail Merge and Automation.
Excel: Introduction to Excel Interface - Creating and Formatting Worksheets - Working with Formulas and Functions - Data Sorting, Filtering, and Validation - Charts and Graphs Creation.

PowerPoint - Introduction to PowerPoint Interface - Creating and Formatting Slides - Adding Animations and Transitions - Using Multimedia Elements (Images, Videos, Audio) - Slide Master and Themes Presenting and Exporting Slides.

Books for Study and Reference:

1. A History of Modern Computing - Paul E. Ceruzzi - MIT Press
2. Computer Organization and Architecture by William Stallings
3. Computer Architecture a Quantitative Approach (5th edition)
4. Abraham Silberschatz - Operating System Concepts (9th Edition, 2012)
5. Microsoft Office Step by Step – Joan Lambert, Curtis Frye – Microsoft Press

Web Resources:

4. History of Computers - Computer Hope
5. Computer Generations - GeeksforGeeks
6. Basic Computer Components - TutorialsPoint
7. Computer Hardware Basics - HowStuffWorks
8. Software Basics - TechTarget

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	Mean
CO1	2	3	3	2	1	1	2	2	2	2.00
CO2	2	3	2	3	1	1	2	2	2	2.00
CO3	3	2	2	2	1	1	3	2	2	2.08
CO4	3	2	2	3	1	1	3	2	3	2.22
CO5	2	3	3	1	1	1	2	2	3	2.08
Mean Overall Score										**2.08**

Prepared by	Verified by
Mr. J. FAYAJUL ARIFEEN	Mr. J. FAYAJUL ARIFEEN

Sem	Category	Course Code	Course Title	Hours	Credits	Int. Marks	Ext. Marks	Max. Marks
IV	SEC	U24SPH402	Analog Electronics (SBS - VI)	30	2	25	75	100

Objectives:

The course covers the principles, design, and applications of amplifiers, oscillators, and operational amplifiers. It explores advanced topics like the IC 555 timer and Phase Locked Loops (PLLs).

Course Outcomes (COs) and Cognitive Level Mapping

COs	CO Statement (After completing the course, the students will be able to)	Cognitive Level
CO1	Identify and describe the function of various transistor amplifiers, with a clear understanding of their operational principles.	K1
CO2	Explain the classification and operation of various oscillators and oscillatory circuits, including the determination of their frequency.	K2
CO3	Apply their knowledge to design and analyze circuits like the scale changer, inverting summing amplifier, subtractor.	K3
CO4	Able to analyze various advanced operational amplifier circuits, and assess their performance in practical scenarios.	K4
CO5	Evaluate and construct circuits using the IC 555 timer, exploring its monostable and astable modes, and applying it to applications such as Schmitt triggers.	K5

Cognitive Levels (K1-Remember**; K2-**Understand**; K3-**Apply**; K4-**Analyze**; K5-**Evaluate**; K6-**Create**)**

UNIT I: **AMPLIFIERS** 6 Hours

Transistor as an Amplifier – Common Emitter Transistor amplifier (NPN) – RC-coupled amplifier – Transformer-coupled amplifier – Direct-coupled amplifier.

Power Amplifiers: Class A – Class B – Class C – Push-pull amplifier.

UNIT II: OSCILLATORS 6 Hours

Introduction – Classification of oscillators – Oscillatory circuit – Frequency of oscillatory circuit – Essentials of transistor oscillator – Barkhausen criterion – Working of Hartley and Colpitt oscillators – RC oscillators – Working of phase shift and Wien bridge oscillators – Crystal oscillator.

UNIT III: Operational Amplifier I 6 Hours

Ideal operational amplifier – Characteristics: CMRR – Slew rate. Inverting Amplifier – Scale changer – Non-inverting Amplifier – Voltage follower – Difference amplifier – Summing amplifier (Inverting mode) – Averager – Instrumentation amplifier.

UNIT IV: Operational Amplifier II 6 Hours

Logarithmic and Antilogarithmic amplifiers – Analog multiplier and divider – Differentiator – Integrator – Comparator – Zero crossing detector – Window detector – RC active filters – First order low pass filter – Second order active filter.

UNIT V: Special Function ICs 6 Hours

IC 555 Timer: Functional block diagram – Monostable operation – Missing pulse detector – Pulse width modulation (PWM) – Astable operation – Frequency Shift Keying (FSK) generator – Schmitt trigger.

Phase Locked Loop (PLL): Basic principles – Digital phase detector – Voltage controlled oscillator (VCO) IC 566 – Frequency multiplication/division.

Text Books:

1. A Text Book of Applied Electronics by R.S.Sedha, S.Chand & Co., New Delhi
2. Principles of Electronics by V.K.Mehta and Rohit Mehta, S.Chand & Co., New Delhi.
3. Linear Integrated Circuits – D. Roy Choudhury & Shail B. Jain – New Age International Publishers, Fourth Edition, 2012.

Reference Books:

1. Electronic Principles by A.P.Malvino, McGraw Hill Book Company.
2. Electronic devices and circuits by Jacob Millman and Christos C. Halkias, Tata McGrew – Hill Edition 1991.
3. Electronic devices and circuits by B. Sasikala and S. Poornachandra, Scitech Publication (India)Pvt. Ltd., Chennai
4. Electronic devices and circuits by Allen Mottershead, Prentice Hall of India Pvt. Ltd., New Delhi.

e-Resources:

1. https://www.power-and-beyond.com/a-detailed-study-of-intrinsic-vs-extrinsic-semiconductors-a-85ba6f59bd2679844038fa12200f4034/
2. https://testbook.com/physics/extrinsic-semiconductor
3. https://www.electronics-tutorials.ws/diode/diode_3.html
4. https://testbook.com/physics/bridge-rectifier

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	Mean
CO1	2	1	2	2	2	3	2	2	2	2
CO2	2	3	2	2	2	3	2	2	2	2.22
CO3	2	2	2	3	2	2	2	3	3	2.33
CO4	2	2	3	2	2	3	2	2	2	2.22
CO5	2	3	3	2	2	2	3	2	2	2.33
Mean Overall Score										**2.22**

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by
Dr. M. MOHAMED RAFI	Mr. J. FAYAJUL ARIFEEN

C. Abdul Hakeem College (Autonomous), Melvisharam.

Syllabus for B.Sc., Mathematics & Physics effective from the year 2025-2026

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
III	*GEL*	***U24ACH301***	***CHEMISTRY FOR PHYSICAL SCIENCES - I (ALLIED)***	***60***	***4***	***25***	***75***	***100***

Objectives:

- To know the concepts of molecular bonding and nuclear chemistry
- To Study about fuels, silicones and fertilizers
- To understand the basic concepts of hybridization, thermodynamics and chromatography

Course Outcomes (COs) and Cognitive Level Mapping:

COs	CO Statement (After completing the course, the students will be able to)	Cognitive Level
CO1	Summarize the molecular orbital theory and nuclear reactions	**K2**
CO2	Explain the properties and uses of fuels, silicones and fertilizers	**K2**
CO3	Differentiate the hybridization, geometries of molecules and mechanism involved in the organic reactions.	**K4**
CO4	Outline types of systems and various laws of thermodynamics	**K4**
CO5	Discuss the principles of volumetric analysis, separation techniques and chromatography	**K2**

Cognitive Levels (K1-Remember**; K2-**Understand**; K3-**Apply**; K4-**Analyze**; K5-**Evaluate**; K6-**Create**)**

UNIT I - Chemical Bonding and Nuclear Chemistry: (12 Hours)

Chemical Bonding: Molecular Orbital Theory-bonding, antibonding and non-bonding orbitals. Molecular orbital diagrams for Hydrogen, Helium, Nitrogen; discussion of bond order and magnetic properties.

Nuclear Chemistry: Fundamental particles - Isotopes, Isobars, Isotones and Isomers-Differences between chemical reactions and nuclear reactions - group displacement law. Nuclear binding energy - mass defect - calculations. Nuclear fission and nuclear fusion – differences. Stellar energy. Applications of radioisotopes - carbon dating, rock dating and medicinal applications.

UNIT II - Industrial Chemistry: (12 Hours)

Fuel gases: Natural gas, water gas, semi water gas, carbureted water gas, producer gas, CNG, LPG and oil gas (manufacturing details not required).

Silicones: Synthesis, properties and uses of silicones.

Fertilizers: Urea, ammonium sulphate, potassium nitrate, NPK fertilizer, superphosphate, triple superphosphate.

UNIT III - Fundamental Concepts in Organic Chemistry: (12 Hours)

Hybridization: Orbital overlap, hybridization and geometry of CH_4, C_2H_4, C_2H_2 and C_6H_6. Electronic effects: Inductive effect and consequences on K_a and K_b of organic acids and bases, electromeric, mesomeric, hyper conjugation and steric effect- examples.

Aromatic electrophilic substitution; nitration, halogenation, Friedel – Craft`s alkylation and acylation.

Heterocyclic compounds: Preparation, properties of pyrrole and pyridine.

UNIT IV - Thermodynamics: **(12 Hours)**

Types of systems, reversible and irreversible processes, isothermal, adiabatic processes and spontaneous processes. Statements of first law and second law of thermodynamics. Carnot cycle and efficiency of heat engine. Entropy and its significance. Free energy change and its importance (no derivation).

Conditions for spontaneity in terms of entropy and Gibbs free energy. Relationship between Gibbs free energy and entropy.

UNIT V - Analytical Chemistry: **(12 Hours)**

Introduction to qualitative and quantitative analysis. Principles of volumetric analysis. Separation and purification techniques - extraction, distillation and crystallization.

Chromatography: principle and applications of column, paper and thin layer chromatography.

 # _____# Self Study Component for Seminar/Assignment:
(Questions should not be asked from self study component in the End Semester Examinations)

Recommended Books:

1. V. Veeraiyan, Text book of Ancillary Chemistry; High mount publishing house, Chennai, first edition,2009.
2. S. Vaithyanathan, Text book of Ancillary Chemistry; PriyaPublications, Karur, 2006.
3. S. Arun Bahl, B.S. Bahl, Advanced Organic Chemistry; S. Chand and Company, New Delhi, twenty third edition, 2012.
4. P.L. Soni, H.M. Chawla, Text Book of Organic Chemistry; Sultan Chand & sons, New Delhi, twenty ninth edition, 2007.

Reference Books:

1. P.L. Soni, Mohan Katyal, Textbook of Inorganic chemistry; Sultan Chand and Company, New Delhi, twentieth edition, 2007.
2. B.R. Puri, L.R. Sharma, M.S. Pathania, Textbook Physical Chemistry; Vishal Publishing Co., New Delhi, forty seventh edition, 2018.
3. B.K. Sharma, Industrial Chemistry; GOEL publishing house, Meerut, sixteenth edition, 2014.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

COs	Programme Outcomes						Programme Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	-	3	3	3
CO2	3	3	3	-	-	-	3	3	3
CO3	3	3	3	-	-	-	3	3	3
CO4	3	3	3	-	-	-	3	3	3
CO5	3	3	3	-	-	-	3	3	3
Mean	3	3	3	-	-	-	3	3	3

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by
Dr. K. Abdul Wasi	Dr. S. Zaheer Ahmed

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
IV	*GEL*	***U24ACH401***	***Chemistry for Physical Sciences - II (Allied)***	***60***	***4***	***25***	***75***	***100***

Objectives:

- To understand the concepts of Coordination Chemistry and Water Technology
- To know about Carbohydrates and Amino acids
- To study the basics of electrochemistry, catalysis and photochemistry

Course Outcomes (COs) and Cognitive Level Mapping:

COs	CO Statement (After completing the course, the students will be able to)	Cognitive Level
CO1	Explain Werner`s theory, chelation and hardness of water.	**K2**
CO2	Illustrate the classifications and properties of carbohydrates and amino acids	**K2**
CO3	Examine the principles of electrochemistry, fuel cells and corrosion.	**K4**
CO4	Examine reaction kinetics and types of catalysts	**K4**
CO5	Outline the various type of photochemical process.	**K2**

Cognitive Levels (K1-Remember**; K2-**Understand**; K3-**Apply**; K4-**Analyze**; K5-**Evaluate**; K6-**Create**)**

UNIT I - Coordination Chemistry and Water Technology: (12 Hours)

Coordination Chemistry: Definition of the terms - IUPAC Nomenclature – Werner`s theory – EAN rule – Pauling`s theory – postulates – Applications to $[Ni(CO)_4]$, $[Ni(CN)_4]^{2-}$, $[Co(CN)_6]^{3-}$ - Chelation - Biological role of Hemoglobin and Chlorophyll (elementary idea) - Applications in qualitative and quantitative analysis.

Water Technology: Hardness of water, determination of hardness of water using EDTA method - Purification techniques – reverse osmosis and distillation method.

UNIT II – Carbohydrates and Aminoacids: (12 Hours)

Carbohydrates: Classification, preparation and properties of glucose, fructose and sucrose. Discussion of open chain ring structures of glucose and fructose. Properties of starch and cellulose.

Amino acids: Classification - preparation and properties of aminoacid, preparation of dipeptides using Bergmann method. RNA and DNA (elementary idea only).

UNIT III –Electrochemistry: (12 Hours)

Galvanic cells - Standard hydrogen electrode - calomel electrode - standard electrode potentials - electrochemical series. Strong and weak electrolytes - ionic product of water -pH, pK_a, pK_b. Conductometric titrations - buffer solutions and its biological applications - electroplating - Nickel and chrome plating.

Types of cells - fuel cells - corrosion and its prevention.

UNIT IV – Kinetics and Catalysis: **(12 Hours)**

Order and molecularity. Integrated rate expression for first order reactions. Evaluation of first order rate constant by graphical method. Pseudo first order reaction, Half-life period. Concept of energy of activation and Arrhenius equation.

Catalysis - Characteristics - Types - Homogeneous and Heterogeneous catalysis – Examples.

UNIT V – Photochemistry: **(12 Hours)**

Grothus – Draper`s law and Stark - Einstein law of photochemical equivalence, Quantum yield – Hydrogen - chlorine reaction. Fluorescence, Phosphorescence, Chemiluminescence and Photosensitization (definition with examples).

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4. P.L. Soni, H.M. Chawla, Text Book of Organic Chemistry; Sultan Chand & sons, New Delhi, twenty ninth edition, 2007.

Reference Books:

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2. B.R. Puri, L.R. Sharma, M.S. Pathania, Textbook Physical Chemistry; Vishal Publishing Co., New Delhi, forty seventh edition, 2018.
3. B.K. Sharma, Industrial Chemistry; GOEL publishing house, Meerut, sixteenth edition, 2014.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

COs	Programme Outcomes						Programme Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	-	3	3	3
CO2	3	3	3	-	-	-	3	3	3
CO3	3	3	3	-	-	-	3	3	3
CO4	3	3	3	-	-	-	3	3	3
CO5	3	3	3	-	-	-	3	3	3
Mean	3	3	3	-	-	-	3	3	3

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by
Dr. K. Abdul Wasi	Dr. S. Zaheer Ahmed

Sem	*Category*	*Course Code*	*Course Title*	*Hours*	*Credits*	*Int. Marks*	*Ext. Marks*	*Max. Marks*
IV	*GEL*	***U24ACHP41***	***ALLIED PRACTICAL - CHEMISTRY FOR PHYSICAL SCIENCES***	***30***	***2***	***25***	***75***	***100***

Objectives:

- To understand laboratory safety
- To learn handling of glass wares
- To study quantitative estimation
- To analyze the organic compounds

Course Outcomes (COs) and Cognitive Level Mapping:

COs	**CO Statement** (After completing the course, the students will be able to)	**Cognitive Level**
CO1	Demonstrate the safety usage of chemicals and common apparatus	**K2**
CO2	Explain the principles of volumetric analysis	**K2**
CO3	Develop the skill to estimate the amount of a substance present in a given solution.	**K6**
CO4	Analyze an organic compound using appropriate test	**K4**
CO5	Identify the presence of special elements and functional groups in an unknown organic compound	**K5**

Cognitive Levels (K1-Remember**; K2-**Understand**; K3-**Apply**; K4-**Analyze**; K5-**Evaluate**; K6-**Create**)**

VOLUMETRIC ANALYSIS:

1. Estimation of sodium hydroxide using standard sodium carbonate.
2. Estimation of hydrochloric acid using standard oxalic acid.
3. Estimation of ferrous sulphate using standard Mohr's salt.
4. Estimation of oxalic acid using standard ferrous sulphate.
5. Estimation of magnesium using EDTA.

SYSTEMATIC ANALYSIS OF ORGANIC COMPOUNDS:

The analysis must be carried out as follows:

(a) Functional group tests: [Acids (mono & di), aromatic primary amine, Diamide, aldehyde and carbohydrate].

(b) Detection of elements (N, S, Halogens).

(c) To distinguish between aliphatic and aromatic compounds.

(d) To distinguish – Saturated and unsaturated compounds.

Reference Books:

1. Venkateswaran, V.; Veeraswamy, R.; Kulandaivelu, A.R. Basic Principles of Practical Chemistry, 2nd ed.; Sultan Chand: New Delhi, 2012.
2. Manna, A.K. Practical Organic Chemistry, Books and Allied: India, 2018.
3. Gurtu, J. N; Kapoor, R. Advanced Experimental Chemistry (Organic), Sultan Chand: New Delhi, 1987.
4. Furniss, B. S.; Hannaford, A. J.; Smith, P. W. G.; Tatchell, A.R. Vogel's Textbook of Practical Organic Chemistry, 5th ed.; Pearson: India,1989.
5. Nad, A. K.; Mahapatra, B.; Ghoshal, A.; An advanced course in Practical *Chemistry,* 3rd ed.; New Central Book Agency: Kolkata, 2007.

e-Resources:

1. https://olseh.iisc.ac.in/wp-content/uploads/2019/03/IIScSafetyManual_Ver1_01.pdf
2. https://chemdictionary.org/titration-indicator
3. https://youtu.be/kc0Nc77t5Ig?si=egmDsIw6W87AQhuo
4. https://youtu.be/4VltXjR64SU?si=RCqrQV8spBW8U5Zu
5. https://microbenotes.com/laboratory-safety-symbols/
6. https://www.vlab.co.in/broad-area-chemical-sciences
7. https://byjus.com/chemistry/steam-distillation/
8. https://youtu.be/SnbXQTTHGs4?si=zhbFDrA5i1Txu6Ae

Mapping of Course Outcomes (COs) with Programme Outcomes (POs) and Programme Specific Outcomes (PSOs)

COs	Programme Outcomes						Programme Specific Outcomes		
	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	3	3	-	-	3	3	3	3
CO2	3	3	3	-	-	3	3	3	3
CO3	3	3	3	-	-	3	3	3	3
CO4	3	3	3	-	-	1	3	3	3
CO5	3	3	3	-	-	1	3	3	3
Mean	3	3	3	-	-	2.2	3	3	3

3 – Strong; 2 – Medium; 1 – Low

Prepared by	Verified by
Dr. S. Khaleel Basha	Dr. S. Zaheer Ahmed