Department of English
Mahatma Gandhi University

Course Structure under the Reorganized CBCS (with effect from AY 2019-20)

Subject: English (First Language)

B.A. / B.Sc. /B.Com. and other UG Courses

Course Objectives

The 20-credit, six-semester course seeks to enhance the English language skills of undergraduate students by

- Strengthening their grammar and vocabulary
- Improving their reading and writing skills
- Enhancing their listening and speaking skills
- Imparting to them important life skills and human values
- Encouraging them to think creatively and critically
- Exposing them to a variety of content-rich texts
- Expanding their emotional intelligence
- Developing gender sensitivity among them.

Course Outcomes

On successful completion of the 20-credit, six-semester course, an undergraduate student will be able to

- Read, understand, interpret a variety of written texts
- Undertake guided and extended writing using appropriate vocabulary and correct grammar
- Listen with comprehension and speak with confidence in both formal and informal contexts with reasonable fluency and acceptable pronunciation
- Become employable with requisite professional skills, ethics and values.

Credits, Syllabus, and Instructional Hours

Semester	Number of Credits	Number of Units	Instruction (Clock hours per week)
I	4	4	4
II	4	4	4
III	3	3	3
IV	3	3	3
V	3	3	3
VI	3	3	3
Total	**20**	**20**	**20**

Reorganized CBCS
(With effect from AY 2019-20)

Subject: English (First Language)

Semesters I & II

Course Code:
Instruction: 4 clock hours per week
Credits: 4
Continuous Assessment: 20 Marks
University Examination: 80 Marks
Duration of University Examination: 3 Hours

Course Structure
Four equal units per semester integrating English language learning with ethics, values, and skill development.

The syllabus will include, but is not limited to, the following components:

Units	Components
I	
II	**Reading and Vocabulary** Passages for language enrichment and personality development (including comprehension, interpretation, creative critical thinking, and empathy)
III	**Writing and Grammar** (including Spelling and Punctuation)
IV	Guided writing, Sequencing, Paragraph, Descriptive writing, Dialogue writing, Note taking, Note making, Letter writing; Parts of speech, Tenses, Articles
V	**Listening and Speaking** (including Conversation and Pronunciation)
VI	Self-introduction, Situation and Function-based conversations; English Speech Sounds (Vowels and Consonants)
VII	**Soft Skills and Values** Inculcating self-confidence, and effecting desirable attitudinal and behavioural changes.
VIII	

Course Code:
Credits: 3 per semester
Instruction: 3 clock hours per week
Continuous Assessment: 20 Marks
University Examination: 80 Marks
Duration of University Examination: 3 Hours

Course Structure
Three equal units per semester integrating English language learning with ethics, values, and skill development.

Two units (one each in Sem V and VI) will be designed to inculcate gender sensitivity. Appropriate course material will be prepared.

The syllabus will include, but is not limited to, the following components:

Unit	Components
I	
II	**Reading**: Fictional and Non-Fictional Prose, Poetry, and Drama for Comprehension, Interpretation, Literary Appreciation, Societal Awareness, Gender Sensitivity, Ecological Awareness, Constitutional Values.
III	
IV	
V	**Writing**: Process writing, Script writing, Personal Diary/journal writing, Essay Writing (different kinds), Report Writing (different kinds), CV Writing, Review/Article Writing.
VI	
VII	**Grammar**: Prepositions, Voice, Connectives, Reported Speech, Conditionals, Common Errors, Concord, Determiners, Degrees of comparison, Relative clauses, Framing questions, Transformation of sentences.
VIII	
IX	
X	
XI	**Vocabulary**: Synonyms, Antonyms, Anagrams, Acronyms, Rhyming words, Picture vocabulary, Indianisms, British-American English, Phrasal Verbs, Idioms, Technical Vocabulary, Commonly Confused Words.
XII	

In addition, the proposed syllabus of Semesters III-VI will impart, as in Semesters I and II, either directly or through the use of authentic materials, **communication skills** (formal and informal conversation skills, debating skills, interview skills etc), **study skills** (reference skills, library skills etc), **social skills** (politeness, patience, participation, cooperation, sharing etc), **soft skills** (such as negotiation, team work, decision making, beating the odds, dealing with failure etc), and **values** (such as honesty, empathy, fortitude, selflessness etc).

DEPARTMENT OF ENGLISH
MAHATMA GANDHI UNIVERSITY
NALGONDA
CBCS GENERAL ENGLISH SYLLABUS STRUCTURE FOR U.G. I YEAR

Prescribed General English Text Book for I Year (Sem -I &Sem -II) for B.A /B. Sc /B.Com and all other U.G. Courses
Title: <u>English for Enhanced Competence</u> Published by Orient Black swan
Editors: Prof. Sumita Roy, Prof. A. Karunakar and K. ArunaPriya

SEMESTER - I

UNIT - I(SHORT FICTION)	TEXT	**The Eyes are not Here - by Ruskin Bond**
	Pronunciation	Consonant Sounds
	Grammar	Nouns
	Vocabulary	Roots
	Spelling	Pick out the words which are wrongly spelt and correct them.
	Punctuation	Capitalization
	Conversation + Role Play	Introducing yourself in a formal or social context to the strangers
	Reading Passage	Historical place: Chayasomeshwaralayam (Nalgonda)
	Writing	Guided writing/expansion
	Soft Skills	Motivation and goal setting
	Value Orientation	Well begun is half done
UNIT - II (PROSE)	Text	**"Work Brings Solace" -Wings Of Fire - A.P.J. Abdul Kalam**
	Pronunciation	Vowel :Monophthongs
	Grammar	Pronoun
	Vocabulary	Prefix and suffix
	Spelling	Use 'Un' or 'dis' to complete the antonyms
	Punctuation	Capitalization
	Conversation + Role play	Starting a conversation/controlling a conversation
	Reading Passage	An important event of Telangana history: Telangana Formation Day
	Writing	Sequencing
	Soft skills	Self confidence
	Value Orientation	Doubt is the beginning of wisdom

UNIT - III (POETRY)	Text	**Bangle Sellers – Sarojini Naidu**
	Pronunciation	Vowel Diphthongs
	Grammar	Helping verbs
	Vocabulary	Homophones, homonyms, homographs
	Spelling	Complete the words using 'tion' on 'sion'
	Punctuation	Comma and full stop
	Conversation + role play	Describing your college and course of study
	Reading passage	A popular Telangana festival: Bathukamma Festival
	Writing	Paragraph/descriptive writing
	Soft skills	Body language/nonverbal communication
	Value orientation	Actions speak louder than words
UNIT - IV (DRAMA)	Text	**Merchant of Venice Act IV Scene –I William Shakespeare**
	Pronunciation	Varied pronunciation of some letters of the Alphabet
	Grammar	Main verbs and tenses
	Vocabulary	Collocation
	Spelling	Complete the following spellings using 'tion' or 'ment'
	Punctuation	Question mark and exclamation mark
	Conversation + Role play	Leaving a message on the answering maechine/ making an appointment on telephone
	Reading Passage	A famous tourist attraction in Nalgonda :Nagarjunsagar, Nalgonda
	Writing	Dialogue
	Soft skills	Inter personal skills
	Value Orientation	Faith will move mountains

SEMESTER - II

UNIT - I (FICTION AND SHORT FICTION)	Text	**The Open Window – H.H.Munro (saki)**
	Pronunciation	Plosives
	Grammar	Nonfinite verbs
	Vocabulary	Simile and metaphor
	Spelling	Complete the following using 'ei' or 'ie'
	Punctuation	Semi colon
	Conversation + Role play	Asking for advice/ asking for information

	Reading Passage	Yagagirigutta: famous pilgrim place in Nalgonda
	Writing	Note Taking and Note Making
	Soft skills	Time Management
	Value Orientation	Time and tide wait for no one
UNIT - II (PROSE)	Text	**The voice of Humanity – Rabindranath Tagore**
	Pronunciation	Fricatives
	Grammar	Adjectives
	Vocabulary	Oxymoron and Hyperbole
	Spelling	Complete the following with 'able' or 'ible'
	Punctuation	Colon and Long dash
	Conversation + Role play	Making a request/ accepting or refusing the request
	Reading Passage	Rural Telangana: Devarakonda Fort history
	Writing	Informal letter
	Soft skills	Leadership skills
	Value Orientation	'The pen is mightier than the sword'
UNIT - III (POETRY)	Text	**If- by Rudyard Kipling**
	Pronunciation	Affricates and Nasals
	Grammar	Articles
	Vocabulary	Portmanteau words and loan words
	Spelling	Complete the following spellings using one of the following suffixes: '-ic', '-ive', '-ity', '-al', '-ance', '-ence'
	Punctuation	Hyphen and Long dash
	Conversation + Role play	Conducting a meeting/seeking opinion of the team members
	Reading Passage	Cultural Identity of Telangana:Telangana Ballads
	Writing	Formal letter
	Soft skills	Stress management
	Value Orientation	Practice makes one perfect
UNIT - IV (DRAMA)	Text	**Riders to the Sea by J.M.Synge**
	Pronunciation	Lateral, frictionless continuants, semi vowels
	Grammar	Adverbs
	Vocabulary	palindromes
	Spelling	Complete the spellings in the following table
	Punctuation	Inverted commas

Spelling table (Unit IV):

Noun	Verb	Adjective	Adverb

	Conversation + Role play	Appearing for a job interview/conducting a job interview
	Reading Passage	Handicrafts of Telangana : Pochampally
	Writing	Business letter
	Soft skills	Etiquette and Grooming
	Value Orientation	Necessarily is the Mother of invention

Testing Pattern in the Reorganized CBCS
(With effect from AY 2019-20)

Subject: English (First Language)

B.A. /B.Sc. /B.Com. and other U.G. Courses

Semesters I & II

I Internal Assessment: 20 marks

II End-Semester Exam: 80 marks
- Section I: 6 short answer Qs to be set. 4 to be answered.
  4 x 5 marks each = 20 marks
- Section II: 4 long answer Qs with internal choice to be set.
  4 x 15 marks each = 60 marks

Note: Questions should cover all units:
- In Section I, Q 1 to be based on Unit I, Q 2 on Unit II and so on.

  In Section II, Q 7 A & B to be based on Unit I, Q 8 A & B to be based on Unit II and so on.

Department of English
Mahatma Gandhi University

Course Structure under the Reorganized CBCS
(with effect from AY 2020-21)

Subject: English (First Language)

B.A. / B.Sc. / B. Com. and other U.G. Courses

Course Objectives
The 20-credit, six-semester course seeks to enhance the English language skills of undergraduate students by
- Strengthening their grammar and vocabulary
- Improving their reading and writing skills
- Enhancing their listening and speaking skills
- Imparting to them important life skills and human values
- Encouraging them to think creatively and critically
- Exposing them to a variety of content-rich texts
- Expanding their emotional intelligence
- Developing gender sensitivity among them.

Course Outcomes
On successful completion of the 20-credit, six-semester course, an undergraduate student will be able to
- Read, understand, interpret a variety of written texts
- Undertake guided and extended writing using appropriate vocabulary and correct grammar
- Listen with comprehension and speak with confidence in both formal and informal contexts with reasonable fluency and acceptable pronunciation
- Become employable with requisite professional skills, ethics and values.

Credits, Syllabus, and Instructional Hours

Semester	Number of Credits	Number of Units	Instruction (Clock hours per week)
I	4	4	4
II	4	4	4
III	3	3	3
IV	3	3	3
V	3	3	3
VI	3	3	3
Total	**20**	**20**	**20**

Department of English
Mahatma Gandhi University
Semesters III & IV

Course Code:

<u>Instruction</u>: **3 clock hours per week**
<u>Credits:</u> **3**
<u>Continuous Assessment</u>: **20 Marks**
<u>University Examination</u>: **80 Marks**
<u>Duration of University Examination</u>: **3 Hours**

Course Structure:

Three equal units per semester integrating English language learning with ethics, values, and skill development.

The syllabus will include, but is not limited to, the following components:

Unit	Components
I	**Reading**: Fictional and Non-Fictional Prose, Poetry, and Drama for Comprehension, Interpretation, Literary Appreciation, and Awareness about Contemporary Issues.
II	
	Writing: Essay Writing (different kinds), Report Writing (different kinds), CV Writing, Review/Article Writing.
III	
IV	**Grammar**: Prepositions, Voice, Connectives, Reported Speech, Conditionals, Common Errors.
V	**Vocabulary**: Phrasal Verbs, Idioms, Technical Vocabulary, Commonly Confused Words.
VI	

Semesters III & IV
(2020-21)
Prescribed General English Text Book for II Year (Semester -III & Semester-IV)
Title*: English for Enhanced Competence-II Published by Orient Black Swan*
Editors: Prof. A. Karunakar and K. Aruna Priya

Semester III

3 Credits   **3 hrs. of Instruction per week**

Unit- I Short Fiction

Text	**The Man Who Saved Pumpelsdrop by W. J. Turner**
Pronunciation	Plural endings and past tense endings
Grammar	Preposition
Vocabulary	Anagrams
Spelling	Difficult words
Punctuation	Capitalization
Conversation	An argument between two/three people about the right way to approach life
Reading	Kasoj Srikanta Chary – Telangana Martyr
Writing	Narrative writing/narrative essay
Soft Skills	Negotiation
Value Education	Hope for the best, but prepare for the worst

Unit-II Prose

Text	**On the Pleasures of No Longer Being Very Young by G.K. Chesterton**
Pronunciation	Syllable
Grammar	Conjunction
Vocabulary	Phrasal verbs
Spelling	Irregular verbs
Punctuation	Comma
Conversation	Friends sharing the experience of being caught in embarrassing situations
Reading	Raavi Narayana Reddy - Freedom Fighter- Son of Nalgonda
Writing	Debate writing/ argumentative essay
Soft Skills	Decision making
Value Education	Better late than never

Unit – III Poetry

Text   **An Irish Airman Foresees his Death by W.B Yeats**

Pronunciation   Consonant cluster
Grammar   Active and passive voice
Vocabulary   Idioms
Spelling   Irregular verbs past tense
Punctuation   Full stop
Conversation   Learning to open an account in a bank and net banking
Reading   Munagala Kondala Rao - "Deverakonda Gandhi"
Writing   Rhyming couplets
Soft Skills   Problem solving
Value Education Early bird catches the worm

Semester IV

3 Credits   **3 hrs. of Instruction per week**

UNIT I (DRAMA)

Text   **With the Photographer by Stephen Leacock**

Pronunciation   Word stress—Prefix
Grammar   Direct and Indirect speech
Vocabulary   Eponyms
Spelling   Words commonly used in cinema, TV, media
Punctuation   15 lines of drama/dialogue for punctuation
Conversation   5 friends discussing their unique hobbies
Reading   Aarutla Kamala Devi –Women Freedom fighter
Writing   Personal Diary/journal writing
Soft Skills   Team work
Value Education   God helps those who help themselves

UNIT II (letter)

Text   **Letter from a Father to a Daughter by Jawaharlal Nehru**

Pronunciation   Word stress—suffix
Grammar   Change of degrees of comparison
Vocabulary   Words often confused
Spelling   Silent letter words
Punctuation   Short fiction passage with mistakes in punctuation for correction/editing
Conversation   How people behave when unexpected/unwelcome guests arrive
Reading   Uppala Malsoor – A Man of Soil
Writing   Expository essay
Soft Skills   Emotional intelligence
Value Education   Actions speak louder than words

UNIT III (SHORT FICTION)

Text   **How Wealth Accumulates and Men Decay by G.B. Shaw**

Pronunciation   Contractions
Grammar   7 types/ structures of sentences
Vocabulary   Alliteration, rhyming words
Spelling   Doubling of consonants
Punctuation   Short prose passage with mistakes in punctuation for correction/editing
Conversation   A group of students share the experience of visiting different places during their vacation
Reading   Fluorosis – A curse to Nalgonda
Writing   Article for a magazine/newspaper
Soft Skills   Critical thinking
Value Education   There is no time like the present

Department of English
Mahatma Gandhi University
Testing Pattern in the Revised CBCS
Subject: English (First Language)
(With effect from AY 2020-21)

B.A. / B.Sc. / B. Com. and other U. G. Courses

Semesters III and IV

I - Internal Assessment: 20 marks

II End-Semester Exam: 80 marks

Note: The Question Paper Pattern will be uploaded a little later

Unit. No. 1 ప్రాచీన కవిత్వం

1. శకుంతలోపాఖ్యానం- నన్నయ

2. గొడగూచి కథ- పాల్కురికిసోమన

3 సంపరణునితపస్సు- అద్దంకిగంగాధరకవి.

Unit. No. 11 ఆధునిక కవిత్వం

1. కాసులు- గురజాడ అప్పారావు

2. రాజు - కవి- గుర్రంజాషువా

3. గంగిరెద్దు- పల్లాదుర్గయ్య

4. జయభేరి- శ్రీశ్రీ

Unit. No. 111 ఉపవాచకం

రుద్రమదేవి (నవల) -ఒద్దిరాజుసోదరులు

Unit. No. IV వ్యాకరణం

పర్యాయ పదాలు , నానార్థాలు, సంధులు సమాసాలు, తెలుగు వాక్యం

పాఠ్యగ్రంథం: తెలుగు అకాడమీ వారి సాహితీమంజీర

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Question paper model for all semesters

Part A : 6 లఘు ప్రశ్నలకు 4 చేయాలి. = 4X5 = 20

Part B : 7, 8, 9, 10 వ్యాసరూపప్రశ్నలు Internal Choice 4 x 15 = 60

Exam 80+

Internal Assessment 20 = 100 Marks

HEAD
Dept. of Telugu 19·07·2019
Osmania University
Hyderabad-07, Telangana.

Chairman
Board of Studies In Telugu
Osmania University Hyderabad

B.A., B.SC., B.COM & B.B.A (C.B.C.S)IST SEMESTER

TELUGU (IInd LANGUAGE)

SCHEME OF THE QUESTIONPAPER

TIME :3 HRS   MARKS :80

అ భాగం (సంగ్రహసమాధానాలు)

ఏవేని నాలుగు ప్రశ్నలకు క్లుప్తంగా సమాధానాలు రాయండి.   4x5=20

1. ప్రాచీనపద్యభాగంసుండి ఒకసందర్భం

2. ఆధునికపద్యభాగంసుండి ఒకసందర్భం

3. . కవిపరిచయం (ప్రాచీన. ఆధునికపద్యభాగంసుండి)

4. నానార్థాలు (5) రాయాలి. (చాయస్ లేదు)

5. పర్యాయపదాలు (5) రాయాలి. (చాయస్ లేదు)

6. నవలనుండి చిన్నప్రశ్న ఒకటి రాయాలి .

ఆ భాగం (వ్యాసరూపసమాధానాలు)

అన్ని ప్రశ్నలకు వివరంగా సమాధానాలు రాయండి.   15x4=60

7. ప్రాచీన పద్యభాగం నుండి రెండు పద్యాలు ఉంటాయి (ఒకదానికి సందర్భం. కవిపరిచయం.
ప్రతిపదార్థతాత్పర్యాలు. వ్యాకరణాంశాలు విపరించాలి)

8. ప్రాచీస / ఆధునిక పద్యభాగం నుండి రెండుప్రశ్నలు ఉంటాయి. (ఒకదానిక సమాధానం రాయాలి.)

9. నవల నుండి రెండుప్రశ్నలు ఉంటాయి. (ఒకదానిక సమాధానం రాయాలి.)

10. తెలుగు వాక్యనిర్మాణరీతులను సోదాహరణంగా తెల్పండి. **లేదా**

మూడుసంధులను / మూడు సమాసాలను లక్ష్యలక్షణ సమన్వితంగా విపరించాలి

.....✦✦✦.....

HEAD
Dept. of Telugu 10-07-2019
Osmania University
Hyderabad-07, Telangana.

(Prof.V. Nithyanandam)
Chairman
Board of Studies In Telugu
Osmania University Hyderabad

C.B.C.S   PATTERN SYLLABUS FROM 2019 ON WARDS.

B.A., B.SC., B.COM & B.B.A 2nd SEMESTER TELUGU (IInd LANGUAGE)

Unit. No. 1   ప్రాచీన కవిత్వం

1. గజేంద్ర మోక్షం- పోతన
2. హనుమత్ సందేశం- మొల్ల
3. సుభాషితాలు-ఏనుగులక్ష్మణకవి

Unit. No. 11   ఆధునిక కవిత్వం

1. స్నేహలతలేఖ-రాయప్రోలు సుబ్బారావు
2. అంతర్నాదం-దాశరథి
3. ప్రపంచపదులు-సి. నారాయణరెడ్డి
4. అల్విదా-కౌముది

Unit. No. 111   పచన విభాగం

1. యుగాంతం-నెల్లూరి కేశవస్వామి
2. ఎంకన్న-పి.యశోదారెడ్డి
3. మామిడిపండు-సురవరంప్రతాపరెడ్డి
4. మా ఊరుపోయింది.-కృష్ణశాస్త్రి

Unit. No. 1V   ఛందస్సు

(ఉత్పలమాల, చంపకమాల, శార్దూలం, మత్తేభం, ఆటవెలది, తేటగీతి, ద్విపద, సీసం, కందం, ఉత్సాహం, తరళం, స్రగ్ధర, మహాస్రగ్ధర, ముత్యాలసరం)

పాఠ్యగంథం: తెలుగు అకాడమీ వారి సాహితీమంజీర

★ ★ ★ ★ ★

HEAD
Dept. of Telugu 7-2019
Osmania University
Hyderabad-07, Telangana.

(Prof. V. Nithyanandha)
Chairman
Board of Studies In Telugu
Osmania University Hyderabad

B.A., B.SC., B.COM & B.B.A (C.B.C.S) 2 nd SEMESTER

TELUGU (IInd LANGUAGE)

SCHEME OF THE QUESTIONPAPER

TIME :3 HRS   MARKS :80

అ భాగం (సంగ్రహసమాధానాలు)

ఏవేని **నాలుగు** ప్రశ్నలకు క్లుప్తంగా సమాధానాలు రాయండి.   4x5=20

1. ప్రాచీనపద్యభాగంనుండి ఒకసందర్భం

2. ఆధునికపద్యభాగంనుండి ఒకసందర్భం

3. పాఠ్యభాగంలోని కవి/రచయిత పరిచయం

4. ఆధునిక కవితాఖండిక –విశ్లేషణ

5. వచనవిభాగానికి సంబంధించి   ఒక ప్రశ్న

6. పద్యపాదాన్ని ఇచ్చి గణవిభజన చేసి యతిస్థానాన్ని ఛందస్సును గుర్తించుట

ఆ భాగం (వ్యాసరూపసమాధానాలు)

అన్ని ప్రశ్నలకు విపరంగా సమాధానాలు రాయండి.   15x4=60

7. ప్రాచీన పద్యభాగం నుండి రెండు పద్యాలు ఉంటాయి (ఒకదానికి సందర్భం, కవిపరిచయం, ప్రతిపదార్థతాత్పర్యాలు. వ్యాకరణాంశాలు వివరించాలి)

8. ప్రాచీన/ ఆధునిక పద్యభాగాల సుండి రెండు ప్రశ్నలుంటాయి. (ఒకదానికి సమాధానం రాయాలి.)

9. వచనవిభాగం నుండి రెండుప్రశ్నలు ఉంటాయి. (ఒకదానికి సమాధానం రాయాలి.)

10. మూడు ఛందస్సులను లక్ష్యలక్షణ సమన్వితంగా వివరించాలి **లేదా**

    మూడు పద్యపాదాలను ఇచ్చి గణవిభజన చేసి యతిస్థానాన్ని ఛందస్సును గుర్తించమని అడగాలి.

.....**.....

Unit - I. ప్రాచీన పద్యభాగం

1. ధర్మజుని వాక్చాతుర్యం	...	తిక్కన
2. విభీషణ శరణాగతి	...	గోన బుద్దారెడ్డి
3. గుణనిధి కథ	...	శ్రీనాథుడు

Unit - II. ఆధునిక పద్యభాగం
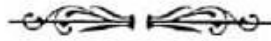
1. రైతు ప్రశస్తి	...	వానమామలై జగన్నాధాచార్యులు
2. గురుదక్షిణ	...	అంబటి లక్ష్మీనరసింహరాజు
3. గుడిసెలు కాలిపోతున్నై	...	డా॥ బోయి భీమన్న

Unit - III. అలంకారాలు

శబ్దాలంకారాలు : వృత్త్యనుప్రాస, ఛేకానుప్రాస, లాటానుప్రాస, అంత్యానుప్రాస, యమకం, ముక్తపదగ్రస్తాలంకారాలు.

అర్థాలంకారాలు : ఉపమ, ఉత్ప్రేక్ష, రూపక, స్వభావోక్తి, ఉల్లేఖ, అర్ధాంతరన్యాస, శ్లేష దృష్టాంతాలంకారాలు.

పాఠ్య గ్రంథం : తెలుగు అకాడమీ వారి 'సాహితీ కిన్నెర' తెలుగు వాచకం

25-08-2020

Chairman
Board of Studies in Telugu
Osmania University Hyderabad

HEAD 08·2020
Dept. of Telugu
Osmania University
Hyderabad-07, Telangana

Time : 3 Hrs.

Marks : 80

అ – భాగం (సంగ్రహ సమాధానాలు)

ఏవేని నాలుగు ప్రశ్నలకు సమాధానాలు రాయండి.   4×5 = 20

1,2. ప్రాచీన పద్యభాగం నుండి ఒక సందర్భం

3,4. ఆధునిక పద్యభాగం నుండి ఒక సందర్భం

5. ప్రాచీన పాఠ్యాంశాల నుండి వస్తు విశ్లేషణ / కవి పరిచయం

6. ఆధునిక పాఠ్యాంశాల నుండి కవుల / రచయితల పరిచయం

ఆ – భాగం (వ్యాసరూప సమాధానాలు)

అన్ని ప్రశ్నలకు సమాధానాలు రాయండి.   15×4 = 60

7. ప్రాచీన పద్యభాగం నుండి రెండు పద్యాలు ఉంటాయి. (ఒకదానికి సందర్భం, కవి పరిచయం, ప్రతిపదార్థ తాత్పర్యాలు, వ్యాకరణాంశాలు వివరించాలి)

8. ప్రాచీన పద్యభాగం నుండి వస్తు విశ్లేషణ సంబంధించిన రెండు ప్రశ్నలిస్తారు. (ఒకదానికి సమాధానం రాయాలి)

9. ఆధునిక పద్యభాగం నుండి రెండు ప్రశ్నలు ఉంటాయి. (ఒకదానికి సమాధానం రాయాలి)

10. మొత్తం ఆరు శబ్దార్థాలంకారాలు (3 పేర్లు + 3 ఉదాహరణలు) ఇచ్చి మూడింటికి లక్ష్యలక్షణ సమన్వితంగా వివరించమని అడగాలి.

సహస్రాధినారాయణ
25-08-2020

Chairman
Board of Studies In Telugu
Osmania University Hyderabad

సహస్రాధినారాయణ
25-08-2020

H E A D
Dept. of Telugu
Osmania University
Hyderabad-07, Telangana

Unit - I. ప్రాచీన పద్యభాగం

1. నారద గానమాత్సర్యం   ...   పింగళి సూరన
2. వాగ్దాన భంగం   ...   ఆసూరి మరింగంటి వేంకట నరసింహాచార్యులు
3. నారసింహ శతకం   ...   ధర్మపురి శేషప్ప

Unit - II. ఆధునిక పద్యభాగం

1. నరుడ నేను, నరుడ నేను   ...   కాళోజీ
2. ఆర్తగీతం   ...   దేవరకొండ బాలగంగాధర తిలక్
3. దేవరకొండ దుర్గం   ...   డా॥ ముకురాల రామారెడ్డి

Unit - III. వచన విభాగం

1. అర్ధరాత్రి అరుణోదయం   ...   దాశరథి రంగాచార్య
2. సి.పి.బ్రౌన్ సాహిత్య సేవ   ...   జానమద్ది హనుమచ్ఛాస్త్రి
3. మన గ్రామ నామాలు   ...   డా॥ కపిలవాయి లింగమూర్తి
4. నివురు తొలగిన నిప్పు   ...   పోల్కంపల్లి శాంతాదేవి
5. కొండమల్లెలు   ...   ఇల్లిందల సరస్వతీదేవి

పాఠ్య గ్రంథం : తెలుగు అకాడమీ వారి 'సాహితీ కిన్నెర' తెలుగు వాచకం

25-08-2020

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అ – భాగం (సంగ్రహ సమాధానాలు)

ఏవేని నాలుగు ప్రశ్నలకు సమాధానాలు రాయండి.   4×5 = 20

1. ప్రాచీన పద్యభాగం నుండి ఒక సందర్భం

2. ఆధునిక పద్యభాగం నుండి ఒక సందర్భం

3. ప్రాచీన, ఆధునిక పాఠ్యాంశాల నుండి వస్తు విశ్లేషణ

4. ఆధునిక పాఠ్యాంశాల నుండి కవుల / రచయితల పరిచయం

5. వచన విభాగం నుండి ప్రశ్న

6. వచన విభాగం నుండి ప్రశ్న

ఆ – భాగం (వ్యాసరూప సమాధానాలు)

అన్ని ప్రశ్నలకు సమాధానాలు రాయండి.   15×4 = 60

7. ప్రాచీన పద్యభాగం నుండి రెండు పద్యాలు ఉంటాయి. (ఒకదానికి సందర్భం, కవి పరిచయం,
    ప్రతిపదార్థ తాత్పర్యాలు, వ్యాకరణాంశాలు వివరించాలి)

8. ప్రాచీన పద్యభాగం నుండి రెండు ప్రశ్నలు ఉంటాయి. (ఒకదానికి సమాధానం రాయాలి)

9. ఆధునిక పద్యభాగం నుండి రెండు ప్రశ్నలు ఉంటాయి. (ఒకదానికి సమాధానం రాయాలి)

10. వచన విభాగం నుండి రెండు ప్రశ్నలు ఉంటాయి. (ఒకదానికి సమాధానం రాయాలి)

సంతోషించాల్సి

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MAHATMA GANDHI UNIVERSITY, NALGONGA
B.A., B.Sc., B.Com & B.B.A (CBSC)
Syllabus – 2021 - 2022

(Second Language)
V Semester

Unit –I కవితా ప్రక్రియలు

1) పద్యం

2) పాట

3) వచన కవిత

4) మిని కవితా రూపాలు,

   హైకూ, నానీలు, మినీకవితలు

5) రుబాయిలు, గజల్

Unit - II తెలుగు వ్యాసం

6) వ్యాసం నిర్వచనం, లక్షణాలు

7) తెలుగువ్యాస పరిణామక్రమం

8) వ్యాస రచన పద్ధతులు

9) వ్యాస రచన భాషా ప్రయోగం

10) వ్యాసం – వస్తు వైవిధ్యం

Unit – III వచన సాహిత్యం

11. అధ్యయన – సంస్కృతి

12. సాహిత్య అధ్యయనం ప్రయోజనాలు

13. ముందుమాట

14. పుస్తక సమీక్ష

15. జానపద సాహిత్య పరిచయం

MAHATMA GANDHI UNIVERSITY, NALGONGA
B.A., B.Sc., B.Com & B.B.A (CBSC)
Syllabus – 2021 -2022

Telugu (Second language)

VI Semester

Unit –I సాహిత్య ప్రక్రియల పరిచయం

1) నాటకం

2) నవల

3) కథానిక

4) జీవితచరిత్ర

5) ఉపన్యాస కళ

Unit - II జర్నలిజంలో మౌళికాంశాలు

6) వార్త – నిర్వచనం, లక్షణాలు

7) లీడ్ - ఎడిటింగ్

8) వార్తా కథనాలు

9) అనువాదం

10) ఇంటర్వ్యూలు

Unit – III ప్రాజెక్టు పరిచయం

11) ప్రాజెక్టు

12) అధ్యయనం

13) పరికల్పన

14) నివేదిక

Department of Hindi,
Osmania University,
Hyderabad – 500 007

Off.Ph.No :04027682371

Dated: 14-06-2019

A meeting of **U.G. Syllabus Review Committee**, Hindi Department, was held today i.e. on **14-06-2019 at 10:30. A.M.** and the following decisions were taken :-

1. As per the instructions of the Council of Higher Education, Telangana State, it has been resolved to extend the Second Language Hindi to U.G. Third Year also i.e. 5th and 6th Semester also. The syllabus, particularly that of the Third year would be a job oriented one.

2. The total Syllabus of U.G. Second Language Hindi would be of 20 Credits. Viz., 1st Year : 08 Credits (1st Semester : 04, 2nd Semester : 04), 2nd Year : 06 Credits (3rd Semester: 03, 4th Semester: 03) and 3rd Year : 06 Credits (5th Semester: 03, 6th Semester: 03)

3. Likewise the Syllabus for 1st Year (1st and 2nd Semester) and 2nd Year (3rd & 4th Semester) was restructured as per the Credits allotted by deleting certain lessons/topics.

4. The Third Year (5th & 6th) Semester Syllabus would be employment oriented one as per the latest market trends. The same would be prepared in the due course of time.

The Second Semester will consist of **04 Credits.** It was resolved unanimously by the Committee Members, to have the following Lessons of the Prose Book **'Gadya Darpan'**, for the B.A., B.Com., B.Sc., II Semester.

The details of the Lessons marked from the said book for B.A., B.Com., and B.Sc. II Semester (Second Language) are as follows.

(A) GADYA DARPAN (for II Semester B.A., B.Com, B.Sc.)

6. Dharti Ka Swarg   Vishnu Prabhakar
7. Taayee   Vishwambharnath Sharma 'Kaushik'
8. Rajneeti Kaa Bantwaaraa   Harishnakar Parsaai
9. Swami Vivekaanand   Vamshidhar Vidyaalankar
10. Paryaavaran Aur Hum   Rajeev Garg

The following stories have been recommended for the **II Semester from Non Detail 'Kathaa Sindhu'** are as follows.

(B) KATHAA SINDHU (for II Semester B.A., B.Com, B.Sc.)

6. Gadal   Raangeya Raaghav
7. Hansoo Yaa Roun   Vinayak Rao Vidyaalankar
8. Waapasi   Usha Priyamwadaa
9. Sevaa   Mamataa Kaaliyaa
10. Siliyaa   Susheelaa Takbhore

With regard to Grammar the following topics/Subjects were unanimously accepted and recommended for the II Semester by the members.

(C) GRAMMAR RECOMMENDED (forII Semester B.A., B.Com, B.Sc.)

V. Sandhi Vichched
VI. Antonyms (Vilom Shabd)
VII. Letter Writing: Personal Letters, Official Letters. Letter of Complaints, Application for Appointment.

REFERENCE BOOKS RECOMMENDED BY THE COMMITTEE.

1. Saral Hindi Vyaakaran : Dakshin Bharat Hindi Prachaar Sabhaa.
2. Hindi Vyaakaran : Shyam Chandra Kapoor
3. Prathamik Vyaakaran Evam Rachanaa : Harish Chandra.

The Third Semester will consist of **03 Credits**. After discussing in detail the committee members decided that the Title of the Poetry Book will be **'Kavya Nidhi',** which will consist of **12 Poets** altogether.

It ws resolved to continue Hindi Sahitya Ka Itihas in the Syllabus without any change. Hindi Sahitya Ka Itihas consists of four periods Viz., Aadi Kaal, Bhakti Kaal, Shringaar Kaal and Adhunik Kaal. It was resolved to have Aadi Kaal and Bhakti Kaal in the III Semester and Shringaar Kaal and Adhunik Kaal will be taught in the IV Semester.

The details of the Poets and Poems chosen for B.A., B.Com. and B.Sc. III Semester (Second Language Hindi) are as follows.

I – Kavya Nidhi (For III Semester B.A.,B.Com.,B.Sc.)

1. Kabeer Das   Kabeer Ke Dohe
2. Tulasi Das   Tulasi Das Ke Dohe
3. Maithilisharan Gupt   Navyuvakon Se
4. Ayodhya Singh Upadhyay 'Harioudh'   Phool Aur Kaanta
5. Jai Shankar Prasad   Bharat
6. Subhadra Kumari Chauhan   Mera Nayaa Bachpan

II – Hindi Sahitya Ka Itihas : Main Tendencies of the Following ages.

1. Aadi Kaal : Naamkaran, Paristhitiyaan, Pravrittiyaan
2. Bhakti Kaal : Naamkaran, Paristhitiyaan, Pravrittiyan
3. Brief study of the following Authors and Poets.
   Chand Bardaai
   Soor das
   Tulasi das
   Sumitranandan Pant
   Bharatendu Harishchandra
   Maithilisharan Gupt
   Ramdhari Singh 'Dinkar'

III – General Essay :

Sahitya Aur Samaaj
Vidyaarthi Aur Rajneeti
Vigyaan : Vardaan Yaa Abhishaap
Adhunik Shikshaa Aur Naari
Shikshaa Par Bhoomandalikaran Kaa Prabhaav
Jeewan Mein Swachchataa Kaa Mahatva

IV – Translation from English or Telugu to Hindi.

The Fourth Semester will be of **3 Credits.**

I – Kavya Nidhi (For IV Semester B.A.,B.Com.,B.Sc.)

7. Raheem
8. Bihaari
9. Sooryakant Tripathi 'Nirala'
10. Mahadevi Varma
11. Ramdhari Singh 'Dinkar'
12. Harivansh Rai Bachchan

Raheem Ke Dohe
Bihari Ke Dohe
Bhagwan Buddh Ke Prati
Ve Muskaate Phool Nahin
Kalam Aur Talwaar
Tu Kyon Baith Gayaa Hai Path Par

II – Hindi Sahitya Ka Itihas : Main Tendencies of the following ages

3. Shringaar Kaal : Naamkaran, Paristhitiyaan, Pravrittiyan
4. Aadhunik Kaal :
   (a) Bhartendu Yug, Dwivedi Yug, Chchyaawaad, Pragatiwaad, Prayogwaad.
   (b) Hindi Gadya Kaa Vikaas, Hindi Kahaani, Upanyaas Aur Naatak
5. Brief Study of the Following Authors and Poets :
   Meera Bai
   Bihaari
   Mahaveer Prasad Dwivedi
   Premchand
   Nirala
   Mahadevi Varma
   Agyeya

III – Essays on General Topics :
Vidyaarthi Aur Anushaasan
Aaj Ki Shiksha Neeti
Bharat Mein Berozgaari Ki Samasyaa
Paryaavaran Aur Pradooshan
Bharat Mein Badhati Huyi Jan Sankhyaa
Bharatiya Sanskriti

IV – Comprehension

Reference Books :-

1. Hindi Sahitya Kaa Itihas – Prof.T.Mohan Singh
2. Hindi Sahitya Kaa Sankshipt Itihas – Dr.Vidyasagar Dayal
3. Hindi Sahitya Kaa Sankshipt Itihas – Dr.Tej Narayan Jaiswal
4. Hindi Sahitya Kaa Subodh Itihas – Gulab Rai

Note:- Unit Wise division of the syllabus for the Four Semesters is as the following:-

FIRST UNIT – GADAYA DARPAN

1. Charitra Sangathan   Babu Gulaab Raai
2. Baazaar Darshan   Jainendra Kumar

SECOND UNIT – GADYA DARPAN

1. Bhaabhi   Mahadevi Varma
2. Bharat Mein Sanskriti Sangam   Ramdhari Singh 'Dinkar'
3. Raashtra Kaa Swaroop   Vasudev Sharan Agrawal

THIRD UNIT – KATHA SINDHU

1. Sadgati   Premchand
2. Chhotaa Jaadoogar   Jaya Shankar Prasad
3. Sach Kaa Sauda   Sudarshan
4. Praayashchitt   Bagwati Charan Varma
5. Chief Ki Daawat   Bheeshma Saahani

FOURTH UNIT - GRAMMAR

1. Rewriting of Sentences as directed based on Gender, Number, Tense, Case & Voice.
2. Correction of Sentences.
3. Usages of words into Sentences.
4. Official Hindi, Administrative Terminology (Prashaasanik Shabdaavali)
   Official Designations (Padnaam)
   a) Translation of Hindi words into English.
   b) Translation of English words into Hindi.

REFERENCE BOOKS RECOMMENDED BY THE COMMITTEE

1. Saral Hindi Vyaakaran : Daksin Bharat Hindi Prachaar Sabhaa.
2. Hindi Vyaakaran : Shyam Chandra Kapoor.
3. Prathmik Vyakaran Evam Rachana : Harish Chandra.

SYLLABUS FOR
B.A., B.COM., B.Sc. SECOND SEMESTER HINDI, (04 CREDITS)
SECOND LANGUAGE
OSMANIA UNIVERSITY, W.E.F. 2019-2020

FIRST UNIT – GADAYA DARPAN

1. Dharti Ka Swarg   Vishnu Prabhakar
2. Taayee   Vishwambharnath Sharma 'Kaushik'

SECOND UNIT – GADYA DARPAN

1. Rajneeti Ka Bantwara   Hari Shankar Parasaai
2. Swami Vivekanand   Vanshidhar Vidyalankar
3. Paryawaran Aur Hum   Rajeev Garg

THIRD UNIT – KATHA SINDHU

1. Gadal   Raangeya Raaghav
2. Hansoo Yaa Roun   Vinayak Rao Vidyaalankar
3. Waapasi   Usha Priyamwadaa
4. Sevaa   Mamataa Kaaliyaa
5. Siliyaa   Susheelaa Takhbore

FOURTH UNIT - GRAMMAR

1. Sandhi Vichched
2. Antonyms (Vilom Shabd)
3. Letter Writing: Personal Letters, Official Letters, Letter of Complaints, Applications for Appointment.

REFERENCE BOOKS RECOMMENDED BY THE COMMITTEE

1. Saral Hindi Vyaakaran : Daksin Bharat Hindi Prachaar Sabhaa.
2. Hindi Vyaakaran : Shyam Chandra Kapoor.
3. Prathmik Vyakaran Evam Rachana : Harish Chandra.

SYLLABUS FOR
B.A., B.COM., B.Sc. THIRD SEMESTER HINDI, (03 CREDITS)
SECOND LANGUAGE
OSMANIA UNIVERSITY, W.E.F. 2020-2021

FIRST UNIT – KAVYA NIDHI

1. Kabeer Ke Dohe   Kabeer Das
2. Tulasi Das Ke Dohe   Tulasi Das
3. Navayuvakon Se   Maithilisharan Gupt
4. Phool Aur Kaanta   Ayodhya Singh Upadhyaya 'Harioudh'
5. Bharat   Jaya Shankar Prasad
6. Mera Nayaa Bachpan   Subhadra Kumari Chauhan

SECOND UNIT – HINDI SAHITYA KA ITIHAS : MAIN TENDENCIES OF THE FOLLOWING AGES:

1. Aadi Kaal : Naamkaran, Paristhitiyaan, Pravrittiyaan
2. Bhakti Kaal : Naamkaran, , Paristhitiyaan, Pravrittiyaan

Hindi Sahitya Ka Itihas : Brief Study of the Following Authors and Poets:-
Chand Bardaai
Soor Das
Tulasi Das
Sumitranandan Pant
Bharatendu Harishchandra
Maithilisharan Gupt
Ramdhari Singh 'Dinkar'

THIRD UNIT–GENERAL ESSAY (ON SOCIO-POLITICAL AND LITERARY SUBJECTS) & TRANSLATION

A) **Essay:-**
Sahitya Aur Sammaj
Vidyaarthi Aur Rajneeti
Vigyaan : Vardaan Yaa Abhishaap
Adhunik Shikshaa Aur Naari
Shikshaa Par Bhoomandalikaran Kaa Prabhaav
Jeewan Mein Swachchataa Kaa Mahatva.

B) **Translation:-**

REFERENCE BOOKS:-
1. Hindi Sahitya Kaa Ithihas – Prof.T.Mohan Singh
2. Hindi Sahitya Kaa Sankshipt Itihas – Dr.Vidyasagar Dayal
3. Hindi Sahitya Kaa Sankshipt Itihas – Dr.Tej Narayan Jaiswal
4. Hindi Sahitya Kaa Subodh Ithihas – Gulab Rai

SYLLABUS FOR
B.A., B.COM., B.Sc. FOURTH SEMESTER HINDI, (03 CREDITS)
SECOND LANGUAGE
OSMANIA UNIVERSITY, W.E.F. 2020-2021

FIRST UNIT – KAVYA NIDHI

1.	Raheem Ke Dohe.	Raheem
2.	Bihari Ke Dohe	Bihari
3.	Bhagwan Buddh Ke Prati	Soorya Kant Tripathi 'Nirala'
4.	Ve Muskaate Phool Nahin	Mahadevi Varma
5.	Kalam Aur Talwaar	Ramdhari Singh 'Dinkar'
6.	Tu Kyon Baith Gayaa Hai Path Par	Harivansh Rai Bachchan

SECOND UNIT – HINDI SAHITYA KA ITIHAS : MAIN TENDENCIES OF THE FOLLOWING AGES:

3. Reethi Kaal : Naamkaran, Paristhitiyaan, Pravrittiyaan
4. Aadhunik Kaal :
   a) Bhartendy Yug, Dwivedi Yug, Chchyaawaad, Pragatiwaad, Prayogwaad.
   b) Hindi Gadya Kaa Vikaas : Kahaani, Upanyaas Aur Naatak.

Brief Study of the Following Authors and Poets:-

Meera Bai
Bihari
Mahaveer Prasad Dwivedi
Premchand
Mahadevi Varma
Nirala
Agyeya

THIRD UNIT–GENERAL ESSAY AND COMPREHENSION :

A) Essay :-

Vidyaarthi Aur Anushaasan
Aaj Ki Shiksha Neeti
Bharat Mein Berozgaari Ki Samasyaa
Paryaavaran Aur Pradooshan
Bharat Mein Badhati Huyi Jansankhyaa
Bharatiya Sanskriti

B) Comprehension :-

REFERENCE BOOKS:-
1. Hindi Sahitya Kaa Ithihas – Prof.T.Mohan Singh
2. Hindi Sahitya Kaa Sankshipt Itihas – Dr.Vidyasagar Dayal
3. Hindi Sahitya Kaa Sankshipt Itihas – Dr.Tej Narayan Jaiswal
4. Hindi Sahitya Kaa Subodh Ithihas – Gulab Rai

1ˢᵗ Semester
Hindi 2ⁿᵈ Language
Scheme of Question Paper

Time : 3 hrs   Max. Marks. 80

खण्ड– 'क' (लघु प्रश्नोत्तर)

I. किन्हीं चार प्रश्नों के संक्षेप में उत्तर दीजिए   4x5= 20

1) 'गद्य दर्पण' से प्रश्न।
2) 'गद्य दर्पण' से प्रश्न।
3) 'कथा सिन्धु' से प्रश्न।
4) 'कथा सिन्धु' से प्रश्न।
5) व्याकरणांशों से प्रश्न।
6) व्याकरणांशों से प्रश्न।

खण्ड– 'ख' (दीर्घ प्रश्नोत्तर)

II. निम्नलिखित प्रश्नों के उत्तर विस्तार से लिखिए   4x15= 60

7) 'गद्य दर्पण' से दिये गए 4 गद्यांशों में से किन्हीं दो की सन्दर्भ सहित व्याख्या करना है। $2 \times 7\frac{1}{2} = 15$

8) 'गद्य दर्पण' से पूछे गए दो निबन्धात्मक प्रश्नों में से किसी एक का उत्तर लिखना है।   1x15= 15

9) (क) 'कथा सिन्धु' से पूछे गए दो निबन्धात्मक प्रश्नों में से किसी एक का उत्तर लिखना है। 1x10= 10

   (ख) 'कथा सिन्धु' से दिये गए तीन पात्रों में से किसी एक का चरित्र–चित्रण करना है।   1x5= 5

10) (क) दिये गए 6 वाक्यों में से किन्हीं 4 वाक्यों को निर्देशानुसार लिखना है।   4x1= 4

   (ख) दिये गए 5 अशुद्ध वाक्यों में से किन्हीं 3 के शुद्ध रूप लिखना है।   3x1= 3

   (ग) दिये गए 6 शब्दों में से 3 का अपने वाक्यों में प्रयोग करना है।   3x1= 3

   (घ) दिये गए 8 (4 अंग्रेज़ी + 4 हिन्दी) प्रशासनिक शब्दों / पदनामों में से किन्हीं

   5 का हिंदी / अंग्रेज़ी में अनुवाद करना है।   5x1= 5

2nd Semester
Hindi 2nd Language
Scheme of Question Paper

Time : 3 hrs   Max. Marks. 80

खण्ड– 'क' (लघु प्रश्नोत्तर)

I. किन्हीं चार प्रश्नों के संक्षेप में उत्तर दीजिए   4x5= 20

1) 'गद्य दर्पण' से प्रश्न।
2) 'गद्य दर्पण' से प्रश्न।
3) 'कथा सिन्धु' से प्रश्न।
4) 'कथा सिन्धु' से प्रश्न।
5) व्याकरणांशों से प्रश्न।
6) व्याकरणांशों से प्रश्न।

खण्ड– 'ख' (दीर्घ प्रश्नोत्तर)

II. निम्नलिखित प्रश्नों के उत्तर विस्तार से लिखिए   4x15= 60

7) 'गद्य दर्पण' से दिये गए 4 गद्यांशों में से किन्हीं दो की सन्दर्भ सहित व्याख्या करना है। $2x7\frac{1}{2}$ = 15

8) 'गद्य दर्पण' से पूछे गए दो निबन्धात्मक प्रश्नों में से किसी एक का उत्तर लिखना है।   1x15= 15

9) (क) 'कथा सिन्धु' से पूछे गए दो निबन्धात्मक प्रश्नों में से किसी एक का उत्तर लिखना है।   1x10= 10

   (ख) 'कथा सिन्धु' से दिये गए तीन पात्रों में से किसी एक का चरित्र–चित्रण करना है।   1x5= 5

10) (क) दिये गए 8 शब्दों में से किन्हीं 4 का सन्धि–विच्छेद करना है।   4x1= 4

   (ख) दिये गए 8 शब्दों में से किन्हीं 4 के विलोम रूप लिखना है।   4x1= 4

   (ग) पूछे गए दो (औपचारिक/अनौपचारिक) पत्रों में से एक को लिखना है।   1x7= 7

3rd Semester
Hindi 2ⁿᵈ Language
Scheme of Question Paper

Time : 3 hrs   Max. Marks. 80

खण्ड– 'क'

I.   किन्हीं चार प्रश्नों के संक्षेप में उत्तर दीजिए   4x5= 20

1) 'काव्यनिधि' के प्राचीन पद्य भाग से प्रश्न।

2) ''काव्यनिधि' के प्राचीन पद्य भाग से प्रश्न।

3) 'काव्यनिधि' के नवीन पद्य भाग से प्रश्न।

4) 'काव्यनिधि' के नवीन पद्य भाग से प्रश्न।

5) हिन्दी साहित्य के इतिहास (आदिकाल) से प्रश्न

6) हिन्दी साहित्य के इतिहास (भक्तिकाल) से प्रश्न।

खण्ड– 'ख'

II. निम्नलिखित प्रश्नों के उत्तर विस्तार से लिखिए   4x15= 60

7) 'काव्यनिधि' से दिये गए 4 पद्यांशों में से (प्राचीन पद्य भाग से 2
और नवीन पद्य भाग से 2) किन्हीं दो की सन्दर्भ सहित व्याख्या करना है। $2 \times 7\frac{1}{2} = 15$

8) नवीन पद्य भाग की चार कविताओं में से पूछे गए दो निबन्धात्मक प्रश्नों में
से एक का उत्तर लिखना है।   1x15= 15

9) (क) 'हिन्दी साहित्य के इतिहास से पूछे गए दो निबंधात्मक प्रश्नों (आदिकाल से एक
और भक्तिकाल से एक) में से किसी एक का उत्तर लिखना है।   1x10= 10

(ख) निर्धारित सात साहित्यकारों में से– दिये गए तीन साहित्यकारों में से किसी
एक का संक्षिप्त परिचय लिखना है।   1x5= 5

10) (क) निर्धारित 6 विषयों (शीर्षकों) में से– दिये गए 3 निबंधों में से एक लिखना है।   1x10= 10

(ख) दिये गए 8 अंग्रेज़ी वाक्यों में से किन्हीं पाँच का हिंदी में अनुवाद करना है।   5x1= 5

4ᵗʰ Semester
Hindi 2ⁿᵈ Language
Scheme of Question Paper

Time : 3 hrs **Max. Marks. 80**

खण्ड– 'क'

I. किन्हीं चार प्रश्नों के संक्षेप में उत्तर दीजिए 4x5= 20

1) 'काव्यनिधि' के प्राचीन पद्य भाग से प्रश्न।
2) ''काव्यनिधि'' के प्राचीन पद्य भाग से प्रश्न।
3) 'काव्यनिधि' के नवीन पद्य भाग से प्रश्न।
4) 'काव्यनिधि' के नवीन पद्य भाग से प्रश्न।
5) हिन्दी साहित्य के इतिहास (रीतिकाल) से प्रश्न
6) हिन्दी साहित्य के इतिहास (आधुनिक काल) से प्रश्न।

खण्ड– 'ख'

II. निम्नलिखित प्रश्नों के उत्तर विस्तार से लिखिए 4x15= 60

7) 'काव्यनिधि' से दिये गए 4 पद्यांशों में से (प्राचीन पद्य भाग से 2 और नवीन पद्य भाग से 2) किन्हीं दो की सन्दर्भ सहित व्याख्या करना है। $2 \times 7\frac{1}{2}$ = 15

8) नवीन पद्य भाग की चार कविताओं में से पूछे गए दो निबन्धात्मक प्रश्नों में से एक का उत्तर लिखना है। 1x15= 15

9) (क) 'हिन्दी साहित्य के इतिहास से पूछे गए दो निबंधात्मक प्रश्नों (रीतिकाल से एक और आधुनिक काल से एक) में से किसी एक का उत्तर लिखना है। x10= 10

(ख) निर्धारित सात साहित्यकारों में से– दिये गए तीन साहित्यकारों में से किसी एक का संक्षिप्त परिचय लिखना है। 1x5= 5

10) (क) निर्धारित 6 विषयों (शीर्षकों) में से– दिये गए 3 निबंधों में से एक लिखना है। 1x10= 10

(ख) बोधगम्य गद्यांश– दिये गए गद्यांश से संबंधित 5 प्रश्नों का उत्तर लिखना है। 5x1= 5

Question Paper Model for all semesters

part A : 6 लघु प्रश्नों में से 4 के उत्तर लिखने होंगे।   4 x 5 = 20

Part B : 7,8,9, 10 दीर्घ प्रश्न (Internal Choice)   4 x 15 = 60

Exam   : 80
Internal Assessment   : 20
_____
100

Second Language Hindi U.G. V th & VI th Sem Syllabus

<u>V</u> Th Sem

Unit 1, हिन्दी भाषा के विविध रूप

2. प्रयोजन मूलक हिन्दी

3. राष्ट्र भाषा

4. राज भाषा

5 संपर्क भाषा

Unit 2:- 1, अनुवाद

2, अनुवाद शब्द की उत्पत्ति, अर्थ, परिभाषा एवं स्वरूप

3, अनुवाद का महत्त्व

4, अनुवाद के प्रकार

5, अनुवादक के गुण

6. अनुवाद का अभ्यास

Unit 3. 1, साहित्य की विविध विधाओं का परिचय

2. कविता

3, अमर कहानी

4. उपन्यास

5. नाटक

6 एकांकी

7 निबन्ध

8 आत्मकथा

9. संस्मरण
10. रेखा चित्र

VI th Sem -

Unit - 1 जनसंचार के माध्यम
2. जनसंचार का अर्थ, परिभाषा एवं स्वरूप

3. जनसंचार का महत्व

4. जनसंचार के प्रकार

5. श्रव्य, दृश्य, मुद्रण

6. जन संचार का दायित्व

7. इलेक्ट्रानिक एवं अन्य आधुनिक माध्यम

Unit 2. 1. पत्रकारिता

1. पत्रकारिता का अर्थ, परिभाषा एवं स्वरूप

2. पत्रकारिता का इतिहास

3. पत्रकारिता का महत्व

4. पत्रकारिता के प्रकार

5. पत्रकार के गुण

6. हिन्दी के प्रमुख समाचार पत्र

Unit 3. 1. हिन्दी साहित्य में विविध विमर्श

2. स्त्री विमर्श

3. दलित विमर्श

4. अल्पसंख्यक विमर्श

5. आदिवासी विमर्श

DEPARTMENT OF URDU
UNIVERSITY COLLEGE OF ARTS & SOCIAL SCIENCES
MAHATMA GANDHI UNIVERSITY

B.A., B. Sc & B.Com FIRST YEAR -2016-2017
URDU SECOND LANGUAGE
"MUTALA – E – ADAB" (PART – I)

SEMESTER : I

PAPER – I

URDU PROSE & POETRY

UNIT: I

GHAZALS: Selected two Ghazals of every poet like Quli Qutub Shah – Wali Deccani – Siraj Aurangabadi – Meer Taqi Meer.

1.	QULI QUTUB SHAH	1.	Suno Aaqilan Sab Ke Dunai Hai Fani.
		2.	Meri Sanwli manki piyari dise.
2.	WALI DECCANI	1.	Pi ke hote Na Kar Too Mah Ki Sana.
		2.	Sajan ke bad Aalam mein Dagar nain.
3.	SIRAJ AURANGABADI	1.	Mujhku Ek dam kharar Nain Hargis.
		2.	Jo Tere gham ki Tamanna Na Kiya.
4.	MEER TAQI MEER	1.	Koei Nahin Jahan Mein Jo Andhogeen nahin.
		2.	Hum se tuk Aage Zaman-e-mein Huwa Kya Kya Kuch.

UNIT: II

POETRY:

1.	TAWHEED	By	Nazeer Akbarabadi.
2.	MUSTAQBIL	By	Akber Allahabadi.
3.	FUNOON – E – LATIFA	By	Allama Iqbal.
4.	BAARISH	By	Zafar Ali khan.

UNIT: III

HIKAYAAT :   By Mazhar Ali Vila – Chand Muntaqab Hikayat.

UNIT: IV

DRAMA: By Imtiaz Ali Taaj & Begum Qudsia Zaida– Talash.

UNIT: V

SAFARNAMA: By Saleha Abed Hussain – Hindustan Jannat Nishan.

Reference Book: Compiled by Urdu Department, Osmania University. Hyd. (Published in August 2008 by Urdu Academy – Hyderabad).

DEPARTMENT OF URDU
UNIVERSITY COLLEGE OF ARTS & SOCIAL SCIENCES
MAHATMA GANDHI UNIVERSITY

B.A., B. Sc & B.Com FIRST YEAR - 2016-2017
URDU SECOND LANGUAGE
"MUTALA – E – ADAB" (PART – I)

SEMESTER : II
PAPER – II

URDU PROSE & POETRY

UNIT : I

GHAZALS: Selected two Ghazals of every poet Hyder Ali Aatish – Mirza Ghalib – Khaja Altaf Hussain Hali – Maqboom Mohiuddin.

1.	HYDER ALI AATISH	1.	Soon To Sahi Jahan Mein Hai Tera Fasana Kya.
		2.	Khusha wa dil ke ho jis dil mein Aarzoo Teri.
2.	MIRZA GHALIB	1.	Koyi Din Gar Zindagani Aur hai.
		2.	Koi ko deke dil koi Nawasaje Fughan Kyun Ho.
3.	KHAJA ALTAF HUSSAIN HALI	1.	Mujhe-wo Taab-e Zabt-e-shikayat kahan Hai.
		2.	Dekhna Her Tarafna Majlis main.
4.	MAQDOOM MOHIUDDIN	1.	Aap ki Yaad Aati Rahi Raat bhar
		2.	Zindagi Moutiyoun ki Dhalakti ladi.

UNIT : II

POETRY:

1.	PREET KA GEET	By	Hafeez Jalandhari
2.	AAY SHAREEF INSAANAU	By	Sahir Ludhyanavi
3.	AB KE BARAS	By	Shaaz Tamkanat

UNIT : III

SWANEH :   By Khaja Altaf Hussain Hali– Mirza Ghalib ke Aqlaq – o – Adab.

UNIT : IV

INSHAIYA :   By Mushtaq Ahmed Yousufi – Padhye Gar Beemar.

UNIT : V

AFSANA: By Qurratul ain Hyder – Yeh Ghazi Yeh Tere Purasrar Bande.
KHAKA :   By Mujtaba Hussain – Sulaiman Areeb.

Reference Book: Compiled by Urdu Department, Osmania University. Hyd. (Published in August 2008 by Urdu Academy – Hyderabad).

DEPARTMENT OF URDU
UNIVERSITY COLLEGE OF ARTS & SOCIAL SCIENCES
MAHATMA GANDHI UNIVERSITY

B.A., B. Sc & B.Com SECOND YEAR – 2016-2017
URDU SECOND LANGUAGE
"MUTALA – E – ADAB" (PART – II)

<u>SEMESTER : III</u>

<u>PAPER – III</u>

<u>URDU POETRY & PROSE</u>

UNIT :I

MASNAVI : -　　　Amn Nama by Jaan Nisar Akhtar.

UNIT :II

QASIDA :　　-　　　Dar Shaan – e – Hameedud Dawla by Zauq Dehelvi .

UNIT :III

DAASTAN : -　　　Intequab – e – Sabras by Mulla Wajhi (Selected from "Sabras").

UNIT :IV

NOVEL :　　　-　　　Nasooh ki Saleem Se Guftagoo by Deputy Nazeer Ahmed (Selected from "Taubatun Nasooh").

UNIT :V

INSHAIYA :　 -　　　Zauqu – e – chai Noshi – By Maulana Azad (Selected form "Ghubar – e – Khatir").

Reference Book: Compiled by Urdu Department, Osmania University. Hyd. (Published in 2009 by Urdu Academy – Hyderabad).

DEPARTMENT OF URDU
UNIVERSITY COLLEGE OF ARTS & SOCIAL SCIENCES
MAHATMA GANDHI UNIVERSITY

B.A., B. Sc & B.Com SECOND YEAR – 2016-2017
URDU SECOND LANGUAGE
"MUTALA – E – ADAB" (PART – II)

SEMESTER : IV

PAPER – IV

URDU POETRY & PROSE

UNIT : I

MARISA   -   Garmi Ka Saman by Meer Anees.

UNIT : II

1.   RUBAIYAT -   1.   Anees – Pursan Kue Kab Jawhar – e – Zati Ka hai.

                                      Anees – Duniya bhi Ajab Saray – e – Fani Dekhi.

                               2.   Hali – Duniya – e – Duniyako Naqshe Fani Samjho.

                                      Hali – Yaro Nahin Waqt Aaram ka Yeh.

                               3.   Rawaan – Iflas accha Na Fikr – e – Daulat acchi.

                                      Rawan – Aazad Zameer Huwa Fakhiri Yeh Hai.

                               4.   Amjad – Koshish hai apni Tamam Sataesh ke liye.

                                      Amjad – Kam Zarf Agar daulat – o – Zar Pata hai.

2.   QATAAT   -   1.   Akbar Allahabadi – Chod literature ko apni history ko bhool Ja.

                               2.   Allama Iqbal - Andaz – e – Bayan Gar che bahot shookh

                                      Nahin hai.

UNIT : III

1.   KHUTOOT   -   Two Letters by Safia Akhtar (Selected from "Zere – Lab").

2.   MAZMOON -   Qadeem Urdu Mein Natural Shaeri – By Naseeruddin Hashmi. (Selected

                        from "Qadeem Deccani ke Chand Tah queeqi mazameen").

UNIT : IV

SATIRE   -   Murda Badast Zinda – By Mirza Farhatulla Baig (Selected from Mazameen

                        –e – Farath part II).

UNIT : V

REPORTAZ   -   Kulhind Conference By Izhar Asar.

Reference Book: Compiled by Urdu Department, Osmania University. Hyd. (Published in 2009 by Urdu Academy – Hyderabad).

Dept. of Mathematics
MAHATMA GANDHI UNIVERSITY, NALGONDA

Mathematics Course Structure

(B.Sc. Common Core Syllabus for the Students Admitted from the Academic Year
2019-2020 Batch onwards)

Contents

1 B.Sc. Course Structure Template

Telangana State Council of Higher Education
B.A/B.Sc. Mathematics Course Structure

(Common Core Syllabus for All Universities of Telangana State for the Students Admitted
from the Academic Year 2019-20 Batch onwards)

Paper	Semester	Subject	Hours/ per week	Hours/per week		Max. Marks	Credits
				Theory	*Tutorials		
DSC - I	I	Differential & Integral Calculus	6	5	1	100	5
DSC - II	II	Differential Equations	6	5	1	100	5
DSC - III	III	Real Analysis	6	5	1	100	5
DSC - IV	IV	Algebra	6	5	1	100	5
DSC - V	V	Linear Algebra	6	5	1	100	5
DSE – VI(A)	VI	(A) Numerical Analysis	6	5	1	100	5
DSE – VI(B)	VI	(B) Integral Transforms	6	5	1	100	5
DSE – VI(C)	VI	(C) Analytical Solid Geometry	6	5	1	100	5
SEC-I	III	Theory of Equations	2	2	-	50	2
SEC-II	III	Logic & Sets	2	2	-	50	2
SEC-III	IV	Number Theory	2	2	-	50	2
SEC-IV	IV	Vector Calculus	2	2	-	50	2
Generic Elective	V-A*	1. Basic Mathematics or 2. Mathematics of Finance & Insurance	4	4	-	100	4
Project/ Optional	VI*	Mathematical Modelling	4	4	-	100	4

*Tutorials: Problems solving session for each 20 student's one batch.

1.1   Differential and Integral Calculus

(w.e.f. academic year 2019-20)

DSC-1A   **BS:101**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The course is aimed at exposing the students to some basic notions in differential calculus.

Outcome: By the time students complete the course they realize wide ranging applications of the subject.

Unit- I

Partial Differentiation: Introduction - Functions of two variables - Neighbourhood of a point (a, b) - Continuity of a Function of two variables, Continuity at a point - Limit of a Function of two variables - Partial Derivatives - Geometrical representation of a Function of two Variables - Homogeneous Functions.

Unit- II

Theorem on Total Differentials - Composite Functions - Differentiation of Composite Functions - Implicit Functions - Equality of $f_{xy}(a, b)$ and $f_{yx}(a, b)$ - Taylor's theorem for a function of two Variables - Maxima and Minima of functions of two variables – Lagrange's Method of undetermined multipliers.

Unit- III

Curvature and Evolutes: Introduction - Definition of Curvature - Radius of Curvature - Length of Arc as a Function, Derivative of arc - Radius of Curvature - Cartesian Equations - Newtonian Method - Centre of Curvature - Chord of Curvature.

Evolutes: Evolutes and Involutes - Properties of the evolute.

Envelopes: One Parameter Family of Curves - Consider the family of straight lines - Definition - Determination of Envelope.

Unit- IV

Lengths of Plane Curves: Introduction - Expression for the lengths of curves $y = f(x)$ - Expressions for the length of arcs $x = f(y)$; $x = f(t)$, $y = \phi(t)$; $r = f(\theta)$

Volumes and Surfaces of Revolution: Introduction - Expression for the volume obtained by revolving about either axis - Expression for the volume obtained by revolving about any line - Area of the surface of the frustum of a cone - Expression for the surface of revolution - Pappus Theorems - Surface of revolution.

Text:

- Shanti Narayan, P.K. Mittal *Differential Calculus, S.CHAND, NEW DELHI*
- Shanti Narayan *Integral Calculus, S.CHAND, NEW DELHI*

References:

- William Anthony Granville, Percey F Smith and William Raymond Longley; *Elements of the differential and integral calculus*

- Joseph Edwards , *Differential calculus for beginners*
- Smith and Minton, *Calculus*

- Elis Pine, *How to Enjoy Calculus*
- Hari Kishan, *Differential Calculus*

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1.2   Differential Equations

(w.e.f. academic year 2019-20)

DSC-1B   **BS:201**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The main aim of this course is to introduce the students to the techniques of solving differential equations and to train to apply their skills in solving some of the problems of engineering and science.

Outcome: After learning the course the students will be equipped with the various tools to solve few types differential equations that arise in several branches of science.

Unit- I

Differential Equations of first order and first degree: Introduction - Equations in which Variables are Separable - Homogeneous Differential Equations - Differential Equations Reducible to Homogeneous Form - Linear Differential Equations - Differential Equations Reducible to Linear Form - Exact differential equations - Integrating Factors - Change in variables - Total Differential Equations - Simultaneous Total Differential Equations - Equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$.

Unit- II

Differential Equations first order but not of first degree: Equations Solvable for p - Equations Solvable for y - Equations Solvable for x - Equations that do not contain x (or y)- Equations Homogeneous in x and y - Equations of the First Degree in x and y - Clairaut's equation.
Applications of First Order Differential Equations : Growth and Decay - Dynamics of Tumour Growth - Radioactivity and Carbon Dating - Compound Interest - Orthogonal Trajectories
.

Unit- III

Higher order Linear Differential Equations: Solution of homogeneous linear differential equations with constant coefficients - Solution of non-homogeneous differential equations $P(D)y = Q(x)$ with constant coefficients by means of polynomial operators when $Q(x) = be^{ax}$, $b\sin ax/b\cos ax, bx^k$, $V e^{ax}$ - Method of undetermined coefficients.

Unit- IV

Method of variation of parameters - Linear differential equations with non constant coefficients - The Cauchy - Euler Equation - Legendre's Linear Equations - Miscellaneous Differential Equations.
Partial Differential Equations: Formation and solution- Equations easily integrable - Linear equations of first order.

Text:

   • Zafar Ahsan, *Differential Equations and Their Applications*

References:

- Frank Ayres Jr, *Theory and Problems of Differential Equations.*
- Ford, L.R ; *Differential Equations.*
- Daniel Murray, *Differential Equations.*
- S. Balachandra Rao, *Differential Equations with Applications and Programs.*
- Stuart P Hastings, J Bryce McLead; *Classical Methods in Ordinary Differential Equations.*

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1.3 Real Analysis

(w.e.f. academic year 2020-21)

DSC-1C   **BS:301**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The course is aimed at exposing the students to the foundations of analysis which will be useful in understanding various physical phenomena.
Outcome: After the completion of the course students will be in a position to appreciate beauty and applicability of the course.

Unit- I
Sequences: Limits of Sequences- A Discussion about Proofs-Limit Theorems for Sequences-Monotone Sequences and Cauchy Sequences -Subsequences-Lim sup's and Lim inf's-Series-Alternating Series and Integral Tests .

Unit- II
Continuity: Continuous Functions -Properties of Continuous Functions -Uniform Continuity - Limits of Functions

Unit- III
Differentiation: Basic Properties of the Derivative - The Mean Value Theorem - ⚡ L'Hospital Rule - Taylor's Theorem.

Unit- IV
Integration : The Riemann Integral - Properties of Riemann Integral-Fundamental Theorem of Calculus.

Text:

• Kenneth A Ross,*Elementary Analysis-The Theory of Calculus*

References:

• S.C. Malik and Savita Arora, *Mathematical Analysis, Second Edition, Wiley Eastern Limited, New Age International (P) Limited, New Delhi, 1994.*

• William F. Trench, *Introduction to Real Analysis*

• Lee Larson , *Introduction to Real Analysis I*

• Shanti Narayan and Mittal, *Mathematical Analysis*

• Brian S. Thomson, Judith B. Bruckner, Andrew M. Bruckner; *Elementary Real analysis*

• Sudhir R., Ghorpade, Balmohan V., Limaye; *A Course in Calculus and Real Analysis*

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1.4   Algebra

(w.e.f. academic year 2020-21)

DSC-1D   **BS:401**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The course is aimed at exposing the students to learn some basic algebraic structures like groups, rings etc.
Outcome: On successful completion of the course students will be able to recognize algebraic structures that arise in matrix algebra, linear algebra and will be able to apply the skills learnt in understanding various such subjects.

Unit- I
Groups: Definition and Examples of Groups- Elementary Properties of Groups-Finite Groups - Subgroups -Terminology and Notation -Subgroup Tests - Examples of Subgroups.
Cyclic Groups: Properties of Cyclic Groups - Classification of Subgroups Cyclic Groups.

Unit- II
Permutation Groups: Definition and Notation -Cycle Notation-Properties of Permutations -A Check Digit Scheme Based on D_5 Isomorphisms ; Motivation- Definition and Examples -Cayley's Theorem Properties of Isomorphisms -Automorphisms-Cosets and Lagrange's Theorem Properties of Cosets 138 - Lagrange's Theorem and Consequences-An Application of Cosets to Permutation Groups -The Rotation Group of a Cube and a Soccer Ball.

Unit- III
Normal Subgroups and Factor Groups: Normal Subgroups-Factor Groups -Applications of Factor Groups -Group Homomorphisms - Definition and Examples -Properties of Homomorphisms -The First Isomorphism Theorem.
Introduction to Rings: Motivation and Definition -Examples of Rings -Properties of Rings - Subrings.
Integral Domains: Definition and Examples - Fields –Characteristics of a Ring.

Unit- IV
Ideals and Factor Rings: Ideals -Factor Rings -Prime Ideals and Maximal Ideals.
Ring Homomorphisms: Definition and Examples-Properties of Ring- Homomorphisms.

Text:

- Joseph A Gallian, *Contemporary Abstract algebra (9th edition)*

References:

- Bhattacharya, P.B Jain, S.K.; and Nagpaul, S.R,*Basic Abstract Algebra*
- Fraleigh, J.B, *A First Course in Abstract Algebra.*

- Herstein, I.N, *Topics in Algebra*

- Robert B. Ash, *Basic Abstract Algebra*
- I Martin Isaacs, *Finite Group Theory*

- Joseph J Rotman, *Advanced Modern Algebra*

1.5   Linear Algebra

(w.e.f. academic year 2021-22)

DSC-E   **BS:501**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: The students are exposed to various concepts like vector spaces , bases , dimension, Eigen values etc.
Outcome: After completion this course students appreciate its interdisciplinary nature.

Unit- I
Vector Spaces: Vector Spaces and Subspaces -Null Spaces, Column Spaces, and Linear Transformations -Linearly Independent Sets; Bases -Coordinate Systems -The Dimension of a Vector Space

Unit- II
Rank-Change of Basis - Eigenvalues and Eigenvectors - The Characteristic Equation

Unit- III
Diagonalization -Eigenvectors and Linear Transformations -Complex Eigenvalues - Applications to Differential Equations.

Unit- IV
Orthogonality and Least Squares : Inner Product, Length, and Orthogonality -Orthogonal Sets -Orthogonal Projections - The Gram-Schmidt Process.

Text:

• David C Lay,*Linear Algebra and its Applications* 4*e*

References:

• S Lang, *Introduction to Linear Algebra*

• Gilbert Strang , *Linear Algebra and its Applications*

• Stephen H. Friedberg, Arnold J. Insel, Lawrence E. Spence; *Linear Algebra*

• Kuldeep Singh; *Linear Algebra*

• Sheldon Axler; *Linear Algebra Done Right*

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1.6   Numerical Analysis

(w.e.f. academic year 2021-22)

DSE-1F/A   **BS:601/A**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: Students will be made to understand some methods of numerical analysis.
Outcome: Students realize the importance of the subject in solving some problems of algebra and calculus.

Unit- I
Errors in Numerical Calculations - **Solutions of Equations in One Variable**: The Bisection Method - The Iteration Method - The Method of False Position-Newton's Method - Muller's Method - solution of Systems of Nonlinear Equations.

Unit- II
Interpolation and Polynomial Approximation: Interpolation - Finite Differences - Differences of Polynomials - Newton's formula for Interpolation - Gauss's central differences formulae - Stirling's and Bessel's formula - Lagrange's Interpolation Polynomial - Divided Differences - Newton's General Interpolation formula - Inverse Interpolation.

Unit- III
Curve Fitting: Least Square Curve Fitting: Fitting a Straight Line-Nonlinear Curve Fitting.
Numerical Differentiation and Integration: Numerical Differentiation - Numerical Integration: Trapezoidal Rule-Simpson's 1/3rd-Rule and Simpson's 3/8th-Rule - Boole's and Weddle's Rule - Newton's Cotes Integration Formulae.

Unit- IV
Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Picard's Method - Euler's Methods - Runge Kutta Methods.

Text:

- S.S.Sastry,*Introductory Methods of Numerical Analysis, PHI*

References:

- Richard L. Burden and J. Douglas Faires,*Numerical Analysis* (9*e*)

- M K Jain, S R K Iyengar and R K Jain, *Numerical Methods for Scientific and Engineering computation*

- B.Bradie , *A Friendly introduction to Numerical Analysis*

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1.7   Integral Transforms

(w.e.f. academic year 2021-22)

DSE - 1F/B   **BS:601/B**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: Students will be exposed to Integral Transforms. The students also learning the Applications of Laplace Transforms to Differential Equations which arises in Physics and Engineering Problems.
Outcome: Students apply their knowledge to solve some problems on special functions and Differential Equations by using the Integral Transforms.

Unit- I
Laplace Transforms-Definition-Existence theorem-Laplace transforms of derivatives and integrals – Periodic functions and some special functions.

Unit- II
Inverse Transformations - Convolution theorem - Heaviside's expansion formula.

Unit- III
Applications to ordinary differential equations - solutions of simultaneous ordinary differential equations - Applications to Partial differential equations.

Unit- IV
Fourier Transforms- Sine and cosine transforms-Inverse Fourier Transforms.

Text:

• Vasishtha and Gupta,*Integral Transforms, Krishna Prakashan Media(P), Ltd,Meerut* (2*e*)

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1.8   Analytical Solid Geometry

(w.e.f. academic year 2021-22)

DSE - 1F/C   **BS:601/C**

Theory: 5 credits and Tutorials: 0 credits
Theory: 5 hours /week and Tutorials: 1 hours /week

Objective: Students learn to describe some of the surfaces by using analytical geometry.
Outcome: Students understand the beautiful interplay between algebra and geometry.

Unit- I
Sphere: Definition-The Sphere Through Four Given Points-Equations of a Circle- Intersection of a Sphere and a Line-Equation of a Tangent Plane-Angle of Intersection of Two Spheres-Radical Plane.

Unit- II
Cones and Cylinders: Definition-Condition that the General Equation of second degree Represents a Cone-Cone and a Plane through its Vertex -Intersection of a Line with a Cone.

Unit- III
The Right Circular Cone-The Cylinder- The Right Circular Cylinder.

Unit- IV
The Conicoid: The General Equation of the Second Degree-Intersection of Line with a Conicoid-Plane of contact-Enveloping Cone and Cylinder.

Text:

• Shanti Narayan and P K Mittal,*Analytical Solid Geometry* (17*e*)

References:

• Khaleel Ahmed, *Analytical Solid Geometry*

• S L Loney , *Solid Geometry*

• Smith and Minton, *Calculus*

1.9   Theory of Equations

(w.e.f. academic year 2020-21)

SEC-I

Theory: 2 credits
Theory: 2 hours /week

Objective: Students learn the relation between roots and coefficients of a polynomial equation, Descartes's rule of signs in finding the number of positive and negative roots if any of a polynomial equation bsides some other concepts.
Outcome: By using the concepts learnt the students are expected to solve some of the polynomial equations.

Unit- I
Graphic representation of a polynomial-Maxima and minima values of polynomials-Theorems relating to the real roots of equations-Existence of a root in the general equation -Imaginary roots-Theorem determining the number of roots of an equation-Equal roots-Imaginary roots enter equations in pairs-Descartes' rule of signs for positive roots- Descartes' rule of signs for negative roots.

Unit- II
Relations between the roots and coefficients-Theorem-Applications of the theorem-Depression of an equation when a relation exists between two of its roots-The cube roots of unity Symmetric functions of the roots-examples.

Text:

• W.S. Burnside and A.W. Panton,*The Theory of Equations*

References:

• C. C. Mac Duffee, *Theory of Equations*
• Hall and Knight , *Higher Algebra*

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1.10   Logic and Sets

(w.e.f. academic year 2020-21)

SEC - II

Theory: 4 credits and Tutorials: 0 credits
Theory: 4 hours /week and Tutorials: 1 hours /week

Objective: Students learn some concepts in set theory and logic.
Outcome: After the completion of the course students appreciate its importance in the development of computer science.

Unit- I
Basic Connectives and truth tables - Logical equivalence : Laws of Logic - Logical Implication :
Rules Inference : The Use of Quantifiers - Quantifiers, Definitions, and proofs of Theorems.

Unit- II
Sets and Subsets - Set Operations and the Laws of Set Theory - Counting and Venn Diagrams -
A First Word on Probability - The axioms of Probability - Conditional Probability: Independence
- Discrete Random variables .

Text:

• Ralph P Grimaldi, *Discrete and Combinatorial Mathematics* (5*e*)

References:

• P R Halmos, *Na¨ıve Set Theory*
• E Kamke , *Theory of Sets*

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1.11 Number Theory

(w.e.f. academic year 2020-21)

SEC-III

Theory: 2 credits
Theory: 2 hours /week

Objective: Students will be exposed to some of the jewels like Fermat's theorem, Euler's theorem in the number theory.
Outcome: Student uses the knowledge acquired solving some divisor problems.

Unit- I
The Goldbach conjecture - Basic properties of congruences- Binary and Decimal Representation of Integers - Number Theoretic Functions; The Sum and Number of divisors- The Mobius Inversion Formula- The Greatest integer function.

Unit- II
Euler's generalization of Fermat's Theorem: Euler's Phi function- Euler's theorem Some Properties of the Euler's Phi function.

Text:

• David M Burton,*Elementary Number Theory* (7*e*)

References:

• Thomas Koshy, *Elementary Number Theory and its Applications*
• Kenneth H Rosen, *Elementary Number Theory*

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1.12   Vector Calculus

(w.e.f. academic year 2020-21)

SEC-IV

Theory: 2 credits
Theory: 2 hours /week

Objective: Concepts like gradient, divergence, curl and their physical relevance will be taught.
Outcome: Students realize the way vector calculus is used to addresses some of the problems of physics.

Unit- I
Line Integrals: Introductory Example - Work done against a Force-Evaluation of Line Integrals Conservative Vector Fields.
Surface Integrals: Introductory Example : Flow Through a PipeEvaluation of Surface Integrals.

Unit- II
Volume Integrals: Evaluation of Volume integrals
Gradient, Divergence and Curl: Partial differentiation and Taylor series-Partial differentiation Taylor series in more than one variable-Gradient of a scalar field-Gradients, conservative fields and potentials-Physical applications of the gradient.

Text:

- P.C. Matthews, *Vector Calculus*

References:

- G.B. Thomas and R.L. Finney, *Calculus*

- H. Anton, I. Bivens and S. Davis ; *Calculus*
- Smith and Minton, *Calculus*

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B.Sc. PHYSICS SYLLABUS UNDER CBCS SCHEME
SCHEME OF INSTRUCTION
(Revised and effective from academic year 2019-2020)

Semester	Paper [Theory and Practical]	Instructions Hrs/week	Marks	Credits
I	Paper – I : Mechanics & Oscillations	4	100	4
	Practicals – I : Mechanics & Oscillations	3	50	1
II	Paper – II: Thermal Physics	4	100	4
	Practicals – II : Thermal Physics	3	50	1
III	Paper – III : Electromagnetic Theory	4	100	4
	Practicals – III : Electromagnetic Theory	3	50	1
IV	Paper – IV : Waves & Optics	4	100	4
	Practicals – IV :Waves & Optics	3	50	1
V	Paper –V : A. Modern Physics B. Computational Physics	4	100	4

	Practicals – V: A. Modern Physics
	         B. Computational
	              Physics
		3	50	1

VI	Paper – VI : A. Electronics B. Applied Optics	4	100	4
	Practicals VI: A. Electronics B. Applied Optics	3	50	1

Total credits: 30

Skill Enhancement Courses
1. Experimental methods and Errors analysis
2. Electrical circuits and Networking
3. Basic Instrumentation
4. Biomedical Instrumentation
5. Digital Electronics

Generic Elective:
1. Renewable Energy & Energy Harvesting

Project work /Optional (Nano science)

CHAIRMAN
Board of Studies In Physics
Osmania University, Hyd.

HEAD
Department of Physics
University College of Science
Osmania University, Hyd-

B.Sc. (Physics)- I Year
Semester – I
Paper – I:: Mechanics and Oscillations
(DSC - Compulsory)

Unit – I
Vector Analysis (10)
Scalar and Vector fields, Gradient of a Scalar field and its physical significance. Divergence and Curl of a Vector field and related problems. Vector integration, line, surface and volume integrals. Stokes', Gauss's and Green's theorems- simple applications.

Unit – II
Mechanics of Particles (6)
Laws of motion, motion of variable mass system, motion of a rocket, multi-stage rocket, conservation of energy and momentum. Collisions in two and three dimensions, concept of impact parameter, scattering cross-section.

Mechanics of Rigid Bodies (6)
Definition of Rigid body, rotational kinematic relations, equation of motion for a rotating body, angular momentum and inertial tensor. Euler's equation, precession of a top, Gyroscope.

Unit – III
Central Forces (7)
Central forces – definition and examples, conservative nature of central forces, conservative force as a negative gradient of potential energy, equation of motion under a central force, gravitational potential and gravitational field, motion under inverse square law, derivation of Kepler's laws.

Special theory of Relativity (7)
Galilean relativity, absolute frames, Michelson-Morley experiment, Postulates of special theory of relativity. Lorentz transformation, time dilation, length contraction, addition of velocities, mass-energy relation. Concept of four vector formalism.

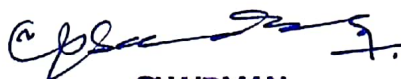## Unit – IV
Oscillations(12)

Simple harmonic oscillator, and solution of the differential equation– Physical characteristics of SHM, torsion pendulum measurements of rigidity modulus, compound pendulum, measurement of g, combination of two mutually perpendicular simple harmonic vibrations of same frequency and different frequencies, Lissajous figures.
Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy considerations, logarithmic decrement, relaxation time, quality factor, differential equation of forced oscillator and its solution, amplitude resonance, velocity resonance.

Note: Problems should be solved at the end of every chapter of all units.

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Suggested books

1. Berkeley Physics Course. Vol.1, **Mechanics** by C. Kittel, W. Knight, M.A. Ruderman - *Tata-McGraw hill Company Edition 2008.*
2. **Fundamentals of Physics.** Halliday/Resnick/Walker *Wiley India Edition 2007.*
3. **First Year Physics** - *Telugu Academy.*
4. **Introduction to Physics for Scientists and Engineers.** F.J. Ruche. *McGraw Hill.*
5. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition.*
6. **Theory of relativity - Resnick**

7. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
8. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005.*
9. **An introduction to Mechanics** by Daniel Kleppner& Robert Kolenkow. *The McGraw Hill Companies.*
10. **Mechanics.** Hans &Puri. *TMH Publications.*

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B.Sc. (Physics) – I year
Semester - I
Paper – I:: Mechanics and Oscillations Practicals
(DSC - Compulsory)

1. Measurement of errors –simple Pendulum.
2. Calculation of slope and intercept of a $Y= mX +C$ graph by theoretical method (simple pendulum experiment)
3. Study of a compound pendulum- determination of 'g' and 'k'.
4. Y by uniform Bending
5. Y by Non-uniform Bending.
6. Moment of Inertia of a fly wheel.
7. Rigidity moduli by torsion Pendulum.
8. Determine surface tension of a liquid through capillary rise method.
9. Determination of Surface Tension of a liquid by any other method.
10. Determine of Viscosity of a fluid.
11. Observation of Lissajous figures from CRO-Frequency ratio.Amlitude and phase difference of two waves.
12. Study of oscillations of a mass under different combination of springs-Series and parallel
13. Study of Oscillations under Bifilar suspension-Verification of axis theorems

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Suggested Books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragati Prakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastava.

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B.Sc. (Physics)- I Year
Semester – II
Paper – II:: Thermal Physics
(DSC - Compulsory)

Unit – I
Kinetic theory of gases: (4)
Introduction – Deduction of Maxwell's law of distribution of molecular speeds, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases.

Thermodynamics: (8)
Basics of Thermodynamics- Carnot's engine (qualitative)-Carnot's theorem -Kelvin's and Clausius statements – Thermodynamic scale of temperature – Entropy, physical significance – Change in entropy in reversible and irreversible processes – Entropy and disorder – Entropy of universe – Temperature- Entropy (T-S) diagram – Change of entropy of a perfect gas-change of entropy when ice changes into steam.

Unit – II
Thermodynamic potentials and Maxwell's equations: (6)
Thermodynamic potentials – Derivation of Maxwell's thermodynamic relations – Clausius-Clayperon's equation – Derivation for ratio of specific heats – Derivation for difference of two specific heats for perfect gas. Joule Kelvin effect – expression for Joule Kelvin coefficient for perfect and Vanderwaal's gas.

Low temperature Physics: (6)
Joule Kelvin effect – liquefaction of gas using porous plug experiment. Joule expansion – Distinction between adiabatic and Joule Thomson expansion – Expression for Joule Thomson cooling – Liquefaction of helium, Kapitza's method – Adiabatic demagnetization – Production of low temperatures – Principle of refrigeration, vapour compression type.

Unit – III
Quantum theory of radiation: (12)
Black body-Ferry's black body – distribution of energy in the spectrum of Black body – Wein's displacement law, Wein's law, Rayleigh-Jean's law – Quantum theory of radiation - Planck's law – deduction of Wein's law, Rayleigh-Jeans law, Stefan's law from Planck's law. Measurement of radiation using pyrometers – Disappearing filament optical pyrometer – experimental determination – Angstrom pyro heliometer - determination of solar constant, effective temperature of sun.

Unit – IV
Statistical Mechanics: (12)
Introduction, postulates of statistical mechanics. Phase space, concept of ensembles and some known ensembles ,classical and quantum statistics and their differences, concept of probability, Maxwell-Boltzmann's distribution law -Molecular energies in an ideal gas- Maxwell-Boltzmann's velocity distribution law, Bose-Einstein Distribution law, Fermi-Dirac Distribution law, comparison of three distribution laws.

NOTE: Problems should be solved at the end of every chapter of all units.

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Suggested books

1. **Fundamentals of Physics.** Halliday/Resnick/Walker.*C. Wiley India Edition 2007.*
2. **Second Year Physics** – *Telugu Academy.*
3. **Modern Physics** by R. Murugeshan and Kiruthiga Siva Prasath (for statistical Mechanics) *S. Chand & Co.*
4. **Modern Physics** by G. Aruldhas and P. Rajagopal, *Eastern Economy Education.*
5. **Berkeley Physics Course.** Volume-5. **Statistical Physics** by F. Reif. *The McGraw-Hill Companies.*
6. **An Introduction to Thermal Physics** by Daniel V. Schroeder.*Pearson Education Low Price Edition.*
7. **Thermodynamics** by R.C. Srivastava, Subit K. Saha & Abhay K. *Jain Eastern Economy. Edition.*
8. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand & Co. Publications.*
9. B.B. Laud **"Introduction to statistics Mechanics"**(Macmillan 1981)

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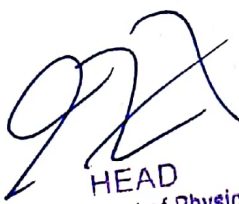Osmania University, Hyd-

B.Sc. (Physics) – I year
Semester - II
Paper – II:: Thermal Physics Practicals
(DSC - Compulsory)

1. Co-efficient of thermal conductivity of a bad conductor by Lee's method.
2. Measurement of Stefan's constant.
3. Specific heat of a liquid by applying Newton's law of cooling correction.
4. Heating efficiency of electrical kettle with varying voltages.
5. Calibration of thermo couple
6. Cooling Curve of a metallic body
7. Resistance thermometer
8. Thermal expansion of solids
9. Study of conversion of mechanical energy to heat.
10. Determine the Specific heat of a solid (graphite rod)

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Suggested Books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragati Prakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastava

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B.Sc. (Physics)- II Year
Semester – III
Paper – III:: Electromagnetic Theory
(DSC - Compulsory)

Unit I : Electrostatics (11 hrs)

Electric Field:- Concept of electric field lines and electric flux, Gauss's law (Integral and differential forms), application to linear, plane and spherical charge distributions. Conservative nature of electric field 'E', Irrotational field. Electric potential:- Concept of electric potential, relation between electric potential and electric field, potential energy of a system of charges. Energy density in an electric field. Calculation of potential from electric field for a spherical charge distribution.

Unit II : Magnetostatics (12 hrs)

Concept of magnetic field 'B' and magnetic flux, Biot-Savart's law, B due to a straight current carrying conductor. Force on a point charge in a magnetic field. Properties of B, curl and divergence of B, solenoidal field. Integral form of Ampere's law, Applications of Ampere's law: field due to straight, circular and solenoidal currents. Energy stored in magnetic field. Magnetic energy in terms of current and inductance. Magnetic force between two current carrying conductors. Magnetic field intensity. Ballistic Galvanometer:- Torque on a current loop in a uniform magnetic field, working principle of B.G., current and charge sensitivity, electromagnetic damping, critical damping resistance.

Unit III: Electromagnetic Induction and Electromagnetic waves (13)

Faraday's laws of induction (differential and integral form), Lenz's law, self and mutual Induction. Continuity equation, modification of Ampere's law, displacement current, Maxwell equations. Maxwell's equations in vacuum and dielectric medium, boundary conditions, plane wave equation: transverse nature of EM waves, velocity of light in vacuum and in medium. Poynting's theorem.

UNIT IV:
Varying and alternating currents (6)

Growth and decay of currents in LR. CR and LCR circuits - Critical damping. Alternating current, relation between current and voltage in pure R, C and L-vector diagrams - Power in ac circuits. LCR series and parallel resonant circuit - Q-factor. AC & DC motors-single phase, three phase (basics only).

Network Theorems(6):

Passive elements, Power sources, Active elements, Network models: T and π Transformations, Superposition theorem, Thevenin's theorem, Norton's theorem. Reciprocity theorem and Maximum power transfer theorem (Simple problems).

Text Books

1. Fundamentals of electricity and magnetism By Arthur F. Kip (McGraw-Hill, 1968)
2. Telugu Academy
3. Electricity and magnetism by J.H.Fewkes& John Yarwood. Vol.I (Oxford Univ. Press, 1991).
4. Introduction to Electrodynamics, 3rd edition, by David J. Griffiths, (Benjamin Cummings,1998).
5. Electricity and magnetism By Edward M. Purcell (McGraw-Hill Education, 1986)
6. Electricity and magnetism. By D C Tayal (Himalaya Publishing House,1988)
7. Electromagnetics by Joseph A.Edminister 2nd ed.(New Delhi: Tata McGraw Hill, 2006).

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B.Sc. (Physics) – II year
Semester - III
Paper – III:: Electromagnetic Theory Practicals
(DSC - Compulsory)

PHYSICS LABORATORY
1. To verify the Thevenin Theorem
2. To verify Norton Theorem
3. To verify Superposition Theorem
4. To verify maximum power transfer theorem.
5. To determine a small resistance by Carey Foster's bridge.
6. To determine the (a) current sensitivity, (b) charge sensitivity, and (c) CDR of a B.G.
7. To determine high resistance by leakage method.
8. To determine the ratio of two capacitances by De Sauty's bridge.
9. To determine self-inductance of a coil by Anderson's bridge using AC.
10. To determine self-inductance of a coil by Rayleigh's method.
11. To determine coefficient of Mutual inductance by absolute method.
12. LR circuit
13. RC circuit
14. LCR series circuit
15. LCR parallel circuit

Note: Minimum of eight experiments should be performed.
Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Suggested Books for Reference:

1. B. L. Worsnop and H. T. Flint, Advanced Practical Physics, Asia Publishing House, New Delhi.
2. InduPrakash and Ramakrishna, A Text Book of Practical Physics, KitabMahal

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Unit-I Waves(12)

Fundamentals of Waves -Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at ends, overtones, energy transport, transverse impedance.

Longitudinal vibrations in bars- wave equation and its general solution. Special cases (i) bar fixed at both ends ii) bar fixed at the mid point iii) bar free at both ends iv) bar fixed at one end. Transverse vibrations in a bar- wave equation and its general solution. Boundary conditions, clamped free bar, free-free bar, bar supported at both ends, Tuning fork.

Unit II: Interference: (12)

Principle of superposition – coherence – temporal coherence and spatial coherence – conditions for Interference of light.

Interference by division of wave front: Fresnel's biprism – determination of wave length of light. Determination of thickness of a transparent material using Biprism – change of phase on reflection – Lloyd's mirror experiment.

Interference by division of amplitude: Oblique incidence of a plane wave on a thin film due to reflected and transmitted light (Cosine law) – Colours of thin films – Non-reflecting films – interference by a plane parallel film illuminated by a point source – Interference by a film with two non-parallel reflecting surfaces (Wedge shaped film) – Determination of diameter of wire-Newton's rings in reflected light with and without contact between lens and glass plate, Newton's rings in transmitted light (Haidinger Fringes) – Determination of wave length of monochromatic light – Michelson Interferometer – types of fringes – Determination of wavelength of monochromatic light, Difference in wavelength of sodium D_1,D_2 lines and thickness of a thin transparent plate.

Unit III: Diffraction: (12)

Introduction – Distinction between Fresnel and Fraunhofer diffraction, Fraunhofer diffraction:- Diffraction due to single slit and circular aperture – Limit of resolution – Fraunhofer diffraction due to double slit – Fraunhofer diffraction pattern with N slits (diffraction grating).

Resolving Power of grating – Determination of wave length of light in normal and oblique incidence methods using diffraction grating.

Fresnel diffraction-Fresnel's half period zones – area of the half period zones –zone plate – Comparison of zone plate with convex lens – Phase reversal zone plate – diffraction at a straight edge – difference between interference and diffraction.

Unit IV: Polarization (12)

Polarized light : Methods of Polarization, Polarizatioin by reflection, refraction, Double refraction, selective absorption , scattering of light – Brewster's law – Malus law – Nicol prism polarizer and analyzer – Refraction of plane wave incident on negative and positive crystals (Huygen's explanation) – Quarter wave plate, Half wave plate – Babinet's compensator – Optical activity, analysis of light by Laurent's half shade polarimeter.

NOTE: Problems should be solved at the end of every chapter of all units.

Suggested books

1. **Optics** by Ajoy Ghatak. *The McGraw-Hill companies.*
2. **Optics** by Subramaniyam and Brijlal. *S. Chand & Co.*
3. **Second Year Physics** – *Telugu Academy.*
4. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand & Co. Publications.*
5. **Fundamentals of Optics** by Jenkins A. Francis and White E. Harvey, *McGraw Hill Inc.*
6. K. Ghatak, **Physical Optics'**
7. D.P. Khandelwal, Optical and Atomic Physics' (Himalaya Publishing House, Bombay,1988)
8. Jenkins and White: 'Fundamental of Optics' (McGraw-Hill)
9. Smith and Thomson: 'Optics' (John Wiley and sons).

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B.Sc. (Physics) – II year
Semester - IV
Paper – IV:: Waves and Optics Practicals
(DSC - Compulsory)

1. Thickness of a wire using wedge method.
2. Determination of wavelength of light using Biprism.
3. Determination of Radius of curvature of a given convex lens by forming Newton's rings.
4. Resolving power of grating.
5. Study of optical rotation-polarimeter.
6. Dispersive power of a prism
7. Determination of wavelength of light using diffraction grating minimum deviation method.
8. Wavelength of light using diffraction grating – normal incidence method.
9. Resolving power of a telescope.
10. Refractive index of a liquid and glass (Boys Method).
11. Pulfrich refractometer – determination of refractive index of liquid.
12. Wavelength of Laser light using diffraction grating.
13. Verification of Laws of a stretched string (Three Laws).
14. Velocity of Transverse wave along a stretched string
15. Determination of frequency of a bar-Melde"s experiment

Note: Minimum of eight experiments should be performed Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Suggested Books

1. D.P. Khandelwal, "A laboratory manual for undergraduate classes" (Vani Publishing House, New Delhi).
2. S.P. Singh, "Advanced Practical Physics" (Pragati Prakashan, Meerut).
3. Worsnop and Flint- Advanced Practical physics for students.
4. "Practical Physics" R.K Shukla, Anchal Srivastav.

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B.Sc. (Physics)- III Year
Semester – V
Paper – V :: (A) Modern Physics
(DSE – Elective I)

UNIT - 1 : SPECTROSCOPY (12)

Atomic Spectra: Introduction - Drawbacks of Bohr's atomic model - Sommerfeld's elliptical orbits - relativistic correction (no derivation). Stern & Gerlach experiment, Vector atom model and quantum numbers associated with it. L-S and j-j coupling schemes. Spectral terms, selection rules, intensity rules - spectra of alkali atoms, doublet fine structure, Zeeman Effect, Paschen-Back Effect and Stark Effect (basic idea).

Molecular Spectroscopy: Types of molecular spectra, pure rotational energies and spectrum of diatomic molecule. Determination of inter nuclear distance. Vibrational energies and spectrum of diatomic molecule. Raman effect, classical theory of Raman effect. Experimental arrangement for Raman effect and its applications.

UNIT – II : Quantum Mechanics (14)

Inadequacy of classical Physics: Spectral radiation - Planck's law (only discussion). Photoelectric effect - Einstien's photoelectric equation. Compton's effect - experimental verification.

Matter waves & Uncertainty principle: de Broglie's hypothesis - wavelength of matter waves, properties of matter waves. Phase and group velocities. Davisson and Germer experiment. Double slit experiment. Standing de Brogile waves of electron in Bohr orbits. Heisenberg's uncertainty principle for position and momentum (x and p_x), Energy and time (E and t). Gamma ray microscope. Diffraction by a single slit. Position of electron in a Bohr orbit. Complementary principle of Bohr.

Schrodinger Wave Equation

Schrodinger time independent and time dependent wave equations. Wave function properties - Significance. Basic postulates of quantum mechanics. Operators, eigen functions and eigen values, expectation values.

Unit - III : Nuclear Physics (10)

Nuclear Structure: Basic properties of nucleus - size, charge, mass, spin, magnetic dipole moment and electric quadrupole moment. Binding energy of nucleus, deuteron binding energy, p-p, n-n, and n-p scattering (concepts), nuclear forces. Nuclear models- liquid drop model, shell model.

Alpha and Beta Decays: Range of alpha particles, Geiger - Nuttal law. Gammow's theory of alpha decay. Geiger - Nuttal law from Gammow's theory. Beta spectrum - neutrino hypothesis,

Particle Detectors: GM counter, proportional counter, scintillation counter.

UNIT: IV: Solid State Physics & Crystolography (12)

Crystal Structure : Crystalline nature of matter. Cystal lattice, Unit Cell, Elements of symmetry. Crystal systems, Bravais lattices. Miller indices. Simple crystal structures (S.C., BCC, FCC, CsCl, NaCl, diamond and Zinc Blende)

X-ray Diffraction: Diffraction of X -rays by crystals, Bragg's law, Experimental techniques - Laue's method and powder method.

Bonding in Crystals: Types of bonding in crystals - characteristics of crystals with different bondings. Lattice energy of ionic crystals - determination of Madelung constant for NaCl crystal. Calculation of Born Coefficient and repulsive exponent. Born-Haber cycle.

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Suggested books

1. Modern Physics by G. Aruldhas & P. Rajagopal. Eastern Economy Edition.
2. Concepts of Modern Physics by Arthur Beiser. Tata McGraw-Hill Edition.
3. Modern Physics by R. Murugeshan and Kiruthiga Siva Prasath. S. Chand & Co.
4. Nuclear Physics by D.C. Tayal, Himalaya Publishing House.
5. Molecular Structure and Spectroscopy by G. Aruldhas. Prentice Hall of India, New Delhi.
6. Spectroscopy -Atomic and Molecular by Gurdeep R Chatwal and Shyam Anand -Himalaya Publishing House.
7. Third Year Physics - Telugu Academy.
8. Elements of Solid State Physics by J.P. Srivastava. (for chapter on nanomaterials)-Prentice-hall of India Pvt. Ltd.

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B.Sc. (Physics Practical) – III year
Semester – V
Paper: V:: A. Modern Physics Practicals
(DSE)

1. Measurement of Planck's constant using black body radiation and photo-detector
2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light
3. To determine the Planck's constant using LEDs of at least 4 different colors.
4. To determine the ionization potential of mercury.
5. To determine the absorption lines in the rotational spectrum of Iodine vapour.
6. To determine the value of e/m by (a) Magnetic focusing or (b) Bar magnet.
7. To setup the Millikan oil drop apparatus and determine the charge of an electron.
8. To show the tunneling effect in tunnel diode using I-V characteristics.
9. To determine the wavelength of laser source using diffraction of single slit.
10. To determine the wavelength of laser source using diffraction of double slits.
11. To determine (1) wavelength and (2) angular spread of He-Ne laser using plane diffraction grating
12. To determine the value of e/m for electron by long solenoid method.
13. Photo Cell – Determination of Planck's constant.
14. To verify the inverse square law of radiation using a photo-electric cell.
15. To find the value of photo electric work function of a material of the cathode using a photo-electric cell.
16. Measurement of magnetic field – Hall probe method.
17. To determine the dead time of a given G.M. tube using double source.
18. Hydrogen spectrum – Determination of Rydberg's constant
19. Energy gap of intrinsic semi-conductor
20. G. M. Counter – Absorption coefficients of a material.
21. To draw the plateau curve for a Geiger Muller counter.
22. To find the half-life period of a given radioactive substance using a G.M. Counter.

Reference Books:

1. Advanced Practical Physics for students, B.L. Flint and H.T. Worsnop, 1971, Asia Publishing House
2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, I. Prakash& Ramakrishna, 11th Edn, 2011,Kitab Mahal

Note: Minimum of eight experiments should be performed.

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B.Sc. (Physics Practical) – III year
Semester – V
Paper: V:: A. Modern Physics Practicals
(DSE)

1. Measurement of Planck's constant using black body radiation and photo-detector
2. Photo-electric effect: photo current versus intensity and wavelength of light; maximum energy of photo-electrons versus frequency of light
3. To determine the Planck's constant using LEDs of at least 4 different colors.
4. To determine the ionization potential of mercury.
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17. To determine the dead time of a given G.M. tube using double source.
18. Hydrogen spectrum – Determination of Rydberg's constant
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20. G. M. Counter – Absorption coefficients of a material.
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22. To find the half-life period of a given radioactive substance using a G.M. Counter.

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2. Advanced level Physics Practicals, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, I. Prakash& Ramakrishna, 11th Edn, 2011,Kitab Mahal

Note: Minimum of eight experiments should be performed.

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B.Sc. (Physics)- III Year
Semester – V
Paper – V :: B Computational Physics
(DSE – Elective II)

Unit I Programming in C (14 hours)

Flow charts, Algorithms, Integer and floating point arithmetic, Precision, Variable types, Arithmetic statements, Input and output statements, Control statements, Executable and non-executable statements, Arrays, Repetitive and logical structures, Subroutines and functions, Operation with files, Operating systems, Creation of executable programs.

UNIT II (14 hours)

Numerical Methods of Analysis:

Solution of algebraic and transcendental equations: Iterative, bisection and Newton-Raphson methods, Solution of simultaneous linear equations: Matrix inversion method, **Interpolation:** Newton and Lagrange formulas, Numerical differentiation, Numerical Integration, Trapezoidal, Simpson and Gaussian quadrature methods, Least-square curve fitting, Straight line and polynomial fits,

UNIT III (14 hours)

Numerical solution of ordinary differential equations: Euler and Runge-Kutta methods. Simulation

Generation of uniformly distributed random integers, Statistical tests of randomness, Monte-Carlo evaluation of integrals and error analysis, Non-uniform probability distributions, Importance of sampling, Rejection method,

Unit IV (14 hours)

Metropolis algorithm, Molecular diffusion and Brownian motion as random walk problems and their MonteCarlo simulation.

Finite element and finite difference methods, boundary value and initial value problems, density functional methods.

    NOTE: Problems should be solved at the end of every chapter of all units.

Suggested Books:
1. Computational Methods in Physics and Engineering: Wong.
2. Computer Oriented Numerical Methods: Rajaraman.
3. Computer Programming in FORTRAN 77: Rajaraman.
4. Applied Numerical Analysis: Gerald.
5. A Guide to Monte Carlo Simulations in Statistical Physics: Land

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B.Sc. (Physics)- III Year
Semester – V
Paper – V :: B Computational Physics Practicals
(DSE – Elective II)

1. Jacobi Method of Matrix Diagonalization

2. Solution of transcendental or polynomial equations by the Newton Raphson method

3. Linear curve fitting and calculation of linear correlation coefficient

4. Matrix summation, subtraction and multiplication

5. Matrix inversion and solution of simultaneous equation

6. Lagrange interpolation based on given input data

7. Numerical integration using the Simpson's method

8. Numerical integration using the Gaussian quadrature method

9. Solution of first order differential equations using the Runge-Kutta method

10. Numerical first order differentiation of a given function

11. Fast Fourier Transform

12. Monte Carlo integration

13. Use of a package for data generation and graph plotting.

14. Test of randomness for random numbers generators

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

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B.Sc. (Physics)- III Year
Semester – VI
Paper – VI :: A. Electronics
(DSE- Elective I)

Unit – I: (12 Hrs)

Band theory of P-N junction

Energy band in solids (band theory), valence band, conduction band and forbidden energy gap in solids, insulators, semiconductors and pure or intrinsic semiconductors and impure or extrinsic semi-conductors. N-type semi-conductors, P-type semi-conductors, Fermi level, continuity equation.

Diodes: P-N junction diode, Half-wave, full-wave and bridge rectifier. Zener diode & its characteristics. Zener diode as voltage regulator.

Unit-II: (12 Hrs)

Bipolar Junction Transistor (BJT) – p-n-p and n-p-n transistors, current components in transistors, CB, CE and CC configurations – transistor as an amplifier - RC coupled amplifier – Frequency response (Qualitative analysis).

Feedback concept & Oscillators: Feedback, General theory of feedback – Concepts of oscillators, Barkhausen's criteria, Phase shift oscillator – Expression for frequency of oscillation.

Unit-III : (10 hrs)

Special devices- Construction and Characteristics: Photo diode - Shockley diode - Solar cell, Opto-couplers - Field Effect Transistor (FET) - FET as an Amplifier - Uni Junction Transistor (UJT), UJT as a relaxation oscillator - Silicon controlled rectifier (SCR) - SCR as a switch.

Unit-IV: (14 Hrs)

Digital Electronics

Binary number system, convertion of binary to decimal and vice-versa. Binary addition and subtraction (1's and 2's complement methods). Hexadecimal number system. Conversion from binary to hexadecimal and vice-versa, Decimal to hexadecimal and vice-versa.

Logic gates:

OR, AND, NOT gates, truth tables, realization of these gates using discrete components. NAND, NOR as universal gates, Exclusive – OR gate (EX-OR). De Morgan's Laws – Verification.

NOTE: Problems should be solved from every chapter of all units.

Suggested books

1. Electronic devices and circuits – Millman and Halkias. *Mc.Graw-Hill Education.*
2. Principles of Electronics by V.K. Mehta – *S. Chand & Co.*
3. Basic Electronics (Solid state) – B. L. Theraja , S. Chand & Co.
4. A First Course in Electronics- Anwar A. Khan &Kanchan K. Dey, PHI.
5. Physics of Semiconductor Devices- S. M. Sze
6. Physics of Semiconductors- Streetman.
7. Basic Electronics – Bernod Grob.
8. Third year Electronics – Telugu Academy
9. Digital Principles & Applications – A.P. Malvino and D.P. Leach

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B.Sc. (Physics Practical) – III year
Semester – VI
Paper: VI::A. Electronics

1. Construction of logic gates (AND, OR, NOT, gates) with discrete components – Truth table Verification
2. AND, OR, NOT – gates constructions using universal gates – Verification of truth tables.
3. Construction of NAND and NOR gates with discrete components and truth table verification
4. Characteristics of a Transistor in CE configuration
5. R.C. coupled amplifier – frequency response.
6. Verification of De Morgan's Theorem.
7. Zener diode V-I characteristics.
8. P-n junction diode V- 1 characteristics.
9. Zener diode as a voltage regulator
10. Construction of a model D.C. power supply
11. R C phase shift Oscillator –determination of output frequency

❖ Every student should complete minimum 06 experiments.

Suggested Books

1. B.Sc. Practical Physics – C. L. Arora – S. Chand & Co.
2. Viva-voce in Physics – R.C. Gupta, Pragathi Prakashan, Meerut.
3. Laboratory manual for Physics Course by B.P. Khandelwal.
4. Practical Physics by M. Arul Thakpathi by Comptex Publishers.
5. B.Sc. practical physics – Subbi Reddy.

Note: Minimum of eight experiments should be performed.

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B.Sc. Semester VI-Theory Syllabus
Subject : (Physics)

(DSE- Elective-II)

Paper-VI:: B. APPLIED OPTICS

Unit I (11hrs)

Principles of Lasers: Emission and absorption of Radiation – Einstein Relations. - Pumping Mechanisms – Optical feedback - Laser Rate equations for two, three and four level lasers. Pumping threshold conditions. – Properties of Laser beams. Classification of laser systems – Gas, Liquid and Solid Lasers: He- Ne, and Argon lasers, their energy level schemes - Ruby laser and YAG laser, GA-As laser, and their applications in various fields.

Unit II (11 hrs)

Holography: Basic Principles of Holography- Recording of amplitude and phase- The recording medium- Reconstruction of original wave front- Image formation by wave front reconstruction- Gaber Hologram- Limitations of Gaber Hologram-Off axis Hologram- Fourier transform Holograms- Volume Holograms, Applications of Holograms.

Unit III (10 hrs)

Fourier and Non-Linear Optics:Fourier optics- Thin lens as phase transformation – Thickness function- Various types of lenses- Fourier transforming properties of lenses – Object placed in front of the lens- Object placed behind the lens.

Non-Linear Optics: Harmonic generation- Second harmonic generation- Phase matching condition- Optical mixing- Parametric generation of light – Self focusing of light.

Unit IV (10 hrs)

Optical Fibers: Fiber types and their structures. Ray optics representation, acceptance angle and numerical aperture. Step index and graded index fibers, single mode and multimode fibers. Fiber Materials for glass fibers and plastic fibers. Signal attenuation in optical fibers: Absorption, scattering and bending losses in fibers, core and cladding losses. Material dispersion, wave guide dispersion, intermodes distortion and pulse broadening.

NOTE: Problems should be solved at the end of every chapter of all units.

Suggested Books:
1. Opto Electronics- An Introduction – Wilson & JFB Hawkes 2nd Edition.
2. Introduction to Fourier optics – J.W. Goodman
3. Lasers and Non-Linear optics – B.B. Laud
4. Optical Electronics – Ghatak nd Thyga Rajan.
5. Principles of Lasers – O. Svelto
6. Optical Fiber Communications – by Gerad Keiser
7. Optical Fiber Communications – by John M. Senior (PHI)

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Applied Optics

1. Study of the profile of a laser beam.

2. Determination of the diameter of a thin wire using laser.

3. Determination of wavelength of He-Ne laser by transmission grating.

4. Construction and recording of a hologram.

5. Study of Fourier transforming properties of lenses.

6. Study of second harmonic generation by KDP crystal.

7. Measurement of numerical aperture of an optical fiber.

8. Measurement of coupling losses in optical fibers.

9. Measurement of bending losses in optical fibers.

10. Study of audio signal transmission through optical fibers.

11. To study the interference of light using optical fibers.

Note: Minimum of eight experiments should be performed. Maximum of 15 students per batch and maximum of three students per experiment should be allotted in the regular practical class of three hours per week.

Suggested Books:

1) Introduction to Fourier Optics – J. Goodman

2) Optical Fiber Communications- John M. Senior

3) Principles of Lasers- O. Svelto

4) Modern Optics- Grant Fowles.

5) Principles of Optics – Born & Wolf

6) Fundamentals of Optics- Jenkins & White

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Skill Enhancement course I

Experimental methods and error analysis

(Credits: 02)   **30 hours**

Unit-I (15 hrs):

Experimental methods: Least count of instruments, Instruments for measuring mass, length, time, angle, current, voltage. Fundamental units. Precision and accuracy of measurements, source of error in measurements, necessity of estimating errors , types of errors, reading error of instrument, calibration error, random error, systematic error, significant digits, order of magnitude and rounding of numbers, rounding error, absolute and relative errors, Errors of computation- addition, subtraction, multiplication, division, error in power and roots, Propagation of errors, analysis of data, standard deviation, calculation of mean value.

Unit II (15 hours)

Stastistical Analysis of errors: Mean, Median and Mode and standard deviation, standard deviation of mean, Least squares fitting, Normal distribution, covariance and correlation, Binomial distribution, passion distribution, chi square test

NOTE: Problems should be solved at the end of every chapter of all units.

References:

1. The theory of Errors in Physical Measurements- J C Pal- New Central Book Agency- 2010

2.   Data reduction and Error analysis for the physical sciences by DK Robinson and P R Bevington

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ELECTRICAL CIRCUIT NETWORKING

(Credits: 02)   30 Hours

Unit I (15 hours)

Basic Electricity Principles: Voltage, Current, Resistance, and Power. Ohm's law. Series, parallel, and series-parallel combinations. AC Electricity and DC Electricity. Familiarization with multimeter, voltmeter and ammeter.

Understanding Electrical Circuits: Main electric circuit elements and their combination. Rules to analyze DC sourced electrical circuits. Current and voltage drop across the DC circuit elements. Single-phase and three-phase alternating current sources. Rules to analyze AC sourced electrical circuits. Real, imaginary and complex power components of AC source. Power factor. Saving energy and money.

Electrical Drawing and Symbols: Drawing symbols. Blueprints. Reading Schematics. Ladder diagrams. Electrical Schematics. Power circuits. Control circuits. Reading of circuit schematics. Tracking the connections of elements and identify current flow and voltage drop.

Generators and Transformers: DC Power sources. AC/DC generators. Inductance, capacitance, and impedance. Operation of transformers.)

Electric Motors: Single-phase, three-phase & DC motors. Basic design. Interfacing DC or AC sources to control heaters & motors. Speed & power of ac motor.

Solid-State Devices: Resistors, inductors and capacitors. Diode and rectifiers. Components in Series or in shunt. Response of inductors and capacitors with DC or AC sources

Unit II (15 hours)

Electrical Protection: Relays. Fuses and disconnect switches. Circuit breakers. Overload devices. Ground-fault protection. Grounding and isolating. Phase reversal. Surge protection. Interfacing DC or AC sources to **control elements (relay protection device)**

Electrical Wiring: Different types of conductors and cables. Basics of wiring-Star and delta connection. Voltage drop and losses across cables and conductors. Instruments to measure current, voltage, power in DC and AC circuits. Insulation. Solid and stranded cable. Conduit. Cable trays. **Splices:** wirenuts, crimps, terminal blocks, split bolts, and solder. Preparation of extension board.

NOTE: Problems should be solved at the end of every chapter of all units.

Reference Books:
- A text book in Electrical Technology - B L Theraja - S Chand & Co.
- A text book of Electrical Technology - A K Theraja
- Performance and design of AC machines - M G Say ELBS Edn..

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Skill Enhancement course III

(Credits: 02)

BASIC INSTRUMENTATION

Unit I (15 hours)

30 hours

Basics of Measurement: Instruments accuracy, precision, sensitivity, resolution range etc. Errors in measurements and loading effects. **Multimeter:** Principles of measurement of dc voltage and dc current, ac voltage, ac current and resistance. Specifications of a multimeter and their significance)

Electronic Voltmeter: Advantage over conventional multimeter for voltage measurement with respect to input impedance and sensitivity. Principles of voltage, measurement (block diagram only). Specifications of an electronic Voltmeter/ Multimeter and their significance. AC millivoltmeter: Type of AC millivoltmeters: Amplifier- rectifier, and rectifier- amplifier. Block diagram ac millivoltmeter, specifications and their significance

Cathode Ray Oscilloscope: Block diagram of basic CRO. Construction of CRT, Electron gun, electrostatic focusing and acceleration (Explanation only– no mathematical treatment), brief discussion on screen phosphor, visual persistence &chemical composition. Time base operation, synchronization. Front panel controls. Specifications of a CRO and their significance.

Use of CRO for the measurement of voltage (dc and ac frequency, time period. Special features of dual trace, introduction to digital oscilloscope, probes. Digital storage Oscilloscope: Block diagram and principle of working.

Unit II (15 hours)

Signal Generators and Analysis Instruments: Block diagram, explanation and specifications of low frequency signal generators. pulse generator, and function generator. Brief idea for testing, specifications. Distortion factor meter, wave analysis.

Impedance Bridges & Q-Meters: Block diagram of bridge. working principles of basic (balancing type) RLC bridge. Specifications of RLC bridge. Block diagram & working principles of a Q- Meter. Digital LCR bridges.

Digital Instruments: Principle and working of digital meters. Comparison of analog & digital instruments. Characteristics of a digital meter. Working principles of digital voltmeter.

Digital Multimeter: Block diagram and working of a digital multimeter. Working principle of time interval, frequency and period measurement using universal counter/ frequency counter, time- base stability, accuracy and resolution.

NOTE: Problems should be solved at the end of every chapter of all units.

Reference Books:

- A text book in Electrical Technology - B L Theraja - S Chand and Co.
- Performance and design of AC machines - M G Say ELBS Edn.
- Digital Circuits and systems, Venugopal, 2011, Tata McGraw Hill.
- Logic circuit design, Shimon P. Vingron, 2012, Springer.
- Digital Electronics, Subrata Ghoshal, 2012, Cengage Learning.
- Electronic Devices and circuits, S. Salivahanan & N. S.Kumar, 3rd Ed., 2012, Tata Mc-Graw Hill
- Electronic circuits: Handbook of design and applications, U.Tietze, Ch.Schenk, 2008, Springer
- Electronic Devices, 7/e Thomas L. Floyd, 2008, Pearson India

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BIOMEDICAL INSTRUMENTATION

(Credits: 02)   **30 hours**

Unit I (15 hours)
FUNDAMENTALS OF BIOMEDICAL ENGINEERING

Cell and its structure – Resting and Action Potential – Nervous system and its fundamentals - Basic components of a biomedical system- Cardiovascular systems- Respiratory systems -Kidney and blood flow - Biomechanics of bone - Biomechanics of soft tissues - Basic mechanics of spinal column and limbs -Physiological signals and transducers - Transducers – selection criteria – Piezo electric, ultrasonic transducers - Temperature measurements - Fibre optic temperature sensors.

NON ELECTRICAL PARAMETERS MEASUREMENT AND DIAGNOSTIC PROCEDURES

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

Unit II (15 hours)
ELECTRICAL PARAMETERS ACQUISITION AND ANALYSIS

Electrodes – Limb electrodes –floating electrodes – pregelled disposable electrodes - Micro, needle and surface electrodes – Amplifiers, Preamplifiers, differential amplifiers, chopper amplifiers – Isolation amplifier - ECG – EEG – EMG – ERG – Lead systems and recording methods – Typical waveforms - Electrical safety in medical environment, shock hazards – leakage current-Instruments for checking safety parameters of biomedical equipments.

IMAGING MODALITIES AND ANALYSIS

Radio graphic and fluoroscopic techniques – Computer tomography – MRI – Ultrasonography – Endoscopy – Thermography –Different types of biotelemetry systems - Retinal Imaging - Imaging application in Biometric systems - Analysis of digital images.

LIFE ASSISTING, THERAPEUTIC AND ROBOTIC DEVICES

Pacemakers – Defibrillators – Ventilators – Nerve and muscle stimulators – Diathermy – Heart – Lung machine – Audio meters – Dialysers – Lithotripsy - ICCU patient monitoring system - Nano Robots - Robotic surgery – Advanced 3D surgical techniques- Orthopedic prostheses fixation.

NOTE: Problems should be solved at the end of every chapter of all units.

References:
1. R. S. Khandpur, Handbook of Biomedical Instrumentation, Tata Mc Graw Hill
2. J. G. Webster, Medical Instrumentation, Application and Design, John Wiley and Sons

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Skill Enhancement course IV

B.Sc. (Physics) – II/III Year
Semester –III/IV/V/VI
Digital Electronics

(SEC)

(Credits: 02)   **30 hours**

Unit I (15 hours)

Number Systems: Decimal, Binary, Octal and Hexadecimal.
Conversion: Binary to Decimal, Octal to Decimal, Hexadecimal to Decimal, Decimal to Binary, Decimal to Octal and Decimal to Hexadecimal.
Binary coded decimal, Exess-3 code, grey code, ASCII code.
Logic Gates: OR, AND, NOT, EX-OR, NAND, NOR, Universal gates.
Half adder and Full adder.

Unit II (15 hours)

Boolean algebra: Boolean laws, DeMorgan's theorems, Sum of products, Product of sums and Karnaugh maps. Multiplexers and Demultiplexers.
Flip-Flops: RS flip-flop, D flip-flop, JK flip-flop and MS flip-flop.
Registers: Types of registers
Counters: Synchronous and Asynchronous counters and their differences.

NOTE: Problems should be solved at the end of every chapter of all units.

References

1. Digital Electronics by Gothman
2. Digital principles and applications by Malvino and Leach

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B.Sc. (Physics)- III Year
Semester –V
Renewable Energy Resources
(GE)

Total: 48 hrs
(4 Hrs / week)

(12 Hrs)

Unit I: Principles of Solar Radiation and Collection (Qualitative only):

Non-renewable energy resources – Principles of power generation and transmission. A model of conventional thermal power plant. Advantages and disadvantages of conventional power plants. Role and potential of new and renewable sources, the solar energy option, environmental impact of solar power, physics of the sun, the solar constant, solar radiation on tilted surface, instruments for measuring solar radiation and sun shine, solar radiation data.

(12 Hrs)

Unit II: Solar Energy Storage and Applications:

Solar energy collectors - Flat plate and concentration collectors, classification of concentration collectors and orientation, advanced collectors. Different sensible, latent heat and stratified storage, solar ponds. Solar Applications – solar heating/ cooling technique, solar distillation and drying, photovoltaic energy conversion.

(12 Hrs)

Unit III: Wind and Bio-Mass Energy:

Resources and potentials, horizontal and vertical axis windmills, performance characteristics. Principles of Bio-Conversion, Energy from waste, types of bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, LPG and CNG.

(12 Hrs)

Unit IV: Geothermal and Ocean Energy:

Resources, types of wells, methods of harnessing the energy, potential in India. OTEC, principles of utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy, Potential and conversion techniques, mini-hydel power plants, land and their economics.

TEXT BOOKS:
1. Non-Conventional Energy Sources - G.D Rai, Khanna Publishers 2. Renewable Energy Resources- Twidell & Wier, CRC Press (Taylor & Francis)

REFERENCE BOOKS:
1. Renewable energy resources - Tiwari and Ghosal, Narosa. 2. Renewable Energy Technologies - Ramesh & Kumar, Narosa 3. Non-Conventional Energy Systems - K Mittal, Wheeler 4. Renewable energy sources and emerging technologies by D.P. Kothari, K.C. Singhal.

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(Credits: 04)　　　　　　　**Paper in lieu of project**　　　　　　**56 hours**

Nano Science

Unit I (14 hours)

Length scales in physics, Nanostructures: 1D, 2D and 3D nanostructures (nanodots, thin films, nanowires, nanorods), Band structure and density of states of materials at nanoscale, Size Effects in nano systems, Quantum confinement in 3D, 2D, 1D nanostructures and its consequences.

Unit II (14 hours)

SYNTHESIS OF NANOSTRUCTURE MATERIALS: Top down and Bottom up approach, Photolithography. Ball milling. Gas phase condensation. Vacuum deposition. Physical vapor deposition (PVD): Thermal evaporation, E-beam evaporation, Pulsed Laser deposition. Chemical vapor deposition (CVD). Sol-Gel. Electro deposition. Spray pyrolysis. Hydrothermal synthesis. Preparation through colloidal methods. MBE growth of quantum dots.
CHARACTERIZATION: X-Ray Diffraction. Optical Microscopy. Scanning Electron Microscopy. Transmission Electron Microscopy. Atomic Force Microscopy. Scanning Tunneling Microscopy.

Unit III (14 hours)

OPTICAL PROPERTIES: Coulomb interaction in nanostructures. Concept of dielectric constant for nanostructures and charging of nanostructure. Quasi-particles and excitons. Excitons in direct and indirect band gap semiconductor nanocrystals.
Quantitative treatment of quasi-particles and excitons, charging effects. Radiative processes: General formalization-absorption, emission and luminescence. Optical properties of heterostrctures and nanostructures.
ELECTRON TRANSPORT: Carrier transport in nano structures. Coulomb blockade effect, thermionic emission, tunneling and hoping conductivity. Defects and impurities: Deep level and surface defects.

Unit IV (14 hours)

APPLICATIONS: Applications of nanoparticles, quantum dots, nanowires and thin films for photonic devices (LED, solar cells). Single electron devices (no derivation).
CNT based transistors. Nanomaterial Devices: Quantum dots heterostructure lasers, optical switching and optical data storage. Magnetic quantum well; magnetic dots - magnetic data storage. Micro Electromechanical Systems (MEMS), Nano Electromechanical Systems (NEMS).

NOTE: Problems should be solved at the end of every chapter of all units.

Reference books:
1. C.P. Poole, Jr. Frank J. Owens, Introduction to Nanotechnology (Wiley India Pvt. Ltd.).
2. S.K. Kulkarni, Nanotechnology: Principles & Practices (Capital Publishing Company)
3. K.K. Chattopadhyay and A. N. Banerjee, Introduction to Nanoscience and Technology (PHI Learning Private Limited).
4. Richard Booker, Earl Boysen, Nanotechnology (John Wiley and Sons).
5. M. Hosokawa, K. Nogi, M. Naita, T. Yokoyama, Nanoparticle Technology Handbook (Elsevier, 2007).
6. Bharat Bhushan, Springer Handbook of Nanotechnology (Springer-Verlag, Berlin, 2004).

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Faculty of Science
Physics
Title of the paper:
Paper:

Duration: 3Hrs]   [Max. Marks : 80

Section-A: Short Answer Questions   (8 x 4 = 32)
Answer any EIGHT questions

1. Unit – I
2. Unit – I
3. Unit – I (Problem)
4. Unit – II
5. Unit – II
6. Unit – II (Problem)
7. Unit – III
8. Unit – III
9. Unit – III (Problem)
10. Unit – IV
11. Unit – IV
12. Unit – IV (Problem)

Section B: Essay Answer Questions   (4 x 12 = 48)

13 (a) Unit – I
    OR
  (b) Unit – I

14 (a) Unit – II
    OR
  (b) Unit – II

15 (a) Unit – III
    OR
  (b) Unit – III

16 (a) Unit – IV
    OR
  (b) Unit – IV

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Telangana State Council of Higher Education, Govt. of Telangana B.Sc., CBCS Common Core Syllabi for all Universities in Telangana
PROPOSED SCHEME FOR CHOICE BASED CREDIT SYSTEM IN
B.Sc., Chemistry from 2019-2020

CODE	COURSE TITLE	COURSE TYPE	HPW	CREDITS
FIRST YEAR- SEMESTER I				
BS 101	Ability Enhancement Compulsory Course AECC-1	ES	2	2
BS 102	English	CC-1A	4	4
BS 103	Second language	CC-2A	4	4
BS 104	Optional I	DSC-1A	4T+3P=7	4+1=5
BS 105	Optional II	DSC-2A	4T+3P=7	4+1=5
BS 106	**Optional III- Chemistry - I** **Laboratory Course – I** **(Qualitative Analysis - Semi Micro Analysis of Mixtures)**	**DSC-3A**	4T 3P } = 7	4 1 }=5
	Total Credits		**31**	**25**
FIRST YEAR- SEMSTER II				
BS 201	Ability Enhancement Compulsory Course AECC-2	BCS	2	2
BS 202	English	CC-1B	4	4
BS 203	Second language	CC-2B	4	4
BS 204	Optional I	DSC-1B	4T+3P=7	4+1=5
BS 205	Optional II	DSC-2B	4T+3P=7	4+1=5
BS 206	**Optional III- Chemistry - II** **Laboratory Course - II** **(Quantitative Analysis – Titrations)**	**DSC-3B**	4T 3P } = 7	4 1 }=5
	Total Credits		**31**	**25**
SECOND YEAR- SEMSTER III				
BS 301	i) Safety Rules in Chemistry Laboratory and Lab Reagents ii) Remedial methods for pollution, drinking water and Soil fertility	**SEC-1** **SEC-2**	**2** **2**	**2** **2**
BS 302	English	CC-1C	3	3
BS 303	Second language	CC-2C	3	3
BS 304	Optional I	DSC-1C	4T+3P=7	4+1=5
BS 305	Optional II	DSC-2C	4T+3P=7	4+1=5
BS 306	**Optional III- Chemistry - III** **Laboratory Course - III** **(Synthesis of Organic compounds)**	**DSC-3C**	4T 3P } = 7	4 1 }=5
	Total Credits		31	**25**
SECOND YEAR- SEMSTER IV				
BS 401	i) Materials and their Applications ii) Chemistry of Cosmetics and Food Processing	**SEC-3** **SEC-4**	**2** **2**	**2** **2**
BS 402	English	CC-1D	3	3
BS 403	Second language	CC-2D	3	3
BS 404	Optional I	DSC-1D	4T+3P=7	4+1=5
BS 405	Optional II	DSC-2D	4T+3P=7	4+1=5
BS 406	**Optional III- Chemistry - IV** **Laboratory Course - IV** **(Qualitative Analysis of Organic Compounds)**	**DSC-3D**	4T 3P } = 7	4 1 } = 5
	Total Credits		31	**25**

* AECC: Ability Enhancement Compulsory Course, SEC: Skill Enhancement Course, DSC: Discipline Specific Course, GE: Generic Elective, ES: Environmental Science , BCS : Basic computer skills.

Unit-I (Inorganic Chemistry)   15 h (1 hr/week)
S1- I-1. Chemical Bonding   8 h

Ionic solids- lattice and solvation energy, solubility of ionic solids, Fajan's rule, polarity and polarizability of ions. VSPER Theory - Common hybridization-sp, sp^2, sp^3 , sp^3d, sp^3d^2 and sp^3d^3, shapes of molecules. Molecular orbital theory: Shapes and sign convention of atomic orbitals. Modes of bonds. Criteria for orbital overlap. LCAO concept. π and σ overlapping. Concept of Types of molecular orbitals- bonding, antibonding and non bonding. MOED of homonuclear diatomics - H_2, N_2, O_2^-, O_2^{2-}, F_2 (unhybridized diagrams only) and heteronuclear diatomics CO, CN^-, NO, NO^+ and HF. Bond order, stability and magnetic properties.

S1-I-2. P-Block Elements 1   7 h

Group–13:   Structure of diborane and higher Boranes (B_4H_{10} and B_5H_9), Boron nitrogen compounds   ($B_3N_3H_6$ and   BN),   Lewis   acid   nature   of BX_3. Group – 14: Carbides-Classification – ionic, covalent, interstitial – .Structures and reactivity. Industrial applications. Silicones –   Classification – straight chain, cyclic and cross-linked. Group – 15: Nitrides – Classification – ionic, covalent and interstitial. Reactivity – hydrolysis. Reactions of hydrazine, hydroxyl amine, phosphazenes.

Unit - II (Organic Chemistry)   15h(1 hr/week)

S1-O-1: Structural Theory in Organic Chemistry   5 h

Bond polarization: Factors influencing the polarization of covalent bonds, electro negativity – inductive effect. Application of inductive effect (a) Basicity of amines (b) Acidity of carboxylic acids (c) Stability of carbonium ions. Resonance - Mesomeric effect, application to (a) acidity of phenol. (b) acidity of carboxylic acids and basicity of anilines. Stability of carbo cations, carbanions and free radicals. Hyper conjugation and its application to stability of carbonium ions, free radicals and alkenes.

S1-O-2: Acyclic Hydrocarbons   6 h

Alkanes– Methods of preparation: From Grignard reagent, Kolbe synthesis. Chemical reactivity - inert nature, free radical substitution, Halogenation example- reactivity, selectivity and orientation.

Alkenes - Preparation of alkenes (with mechanism) (a) by dehydration of alcohols
(b) dehydrohalogenation of alkyl halides (c) by dehalogenation of 1,2 dihalides, Zaitsev's rule. Properties: Anti-addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H_2O, HOX, H_2SO_4 with mechanism and addition of HBr in the presence of peroxide (anti – Markonikov's addition). Oxidation (cis – additions) – hydroxylation by $KMnO_4$, OsO_4,

anti addition- peracids (via epoxidation), hydroboration, ozonolysis – location of double bond. Dienes – Types of dienes, reactions of conjugated dienes – 1,2 and 1,4 addition of HBr to 1,3 – butadiene and Diels – Alder reaction.

Alkynes– Preparation by dehydrohalogenation of vicinal dihalides, dehalogenation of tetrahalides. Physical Properties: Chemical reactivity – electrophilic addition of X_2, HX, H_2O (tautomerism), Oxidation (formation of enediol, 1,2 diones and carboxylic acids) and reduction (Metal-ammonia reduction, catalytic hydrogenation).

Aromatic Hydrocarbons   4h

Introduction to aromaticity: Huckel's rule – Benzene, Naphthalene and Anthracene. Reactions - General mechanism of electrophilic substitution, mechanism of nitration, sulphonation and halogenation, Friedel Craft's alkylation and acylation. Orientation of aromatic substitution - Definition of ortho, para, and meta directing groups. Ring activating and deactivating groups with examples. Orientation – (i) activating groups: Amino, methoxy and alkyl groups. (ii) Deactivating groups - nitro, nitrile, carbonyl, carboxylic acid, sulphonic acid and halo groups.

Unit – III (Physical Chemistry)   15h(1 hr/week)

S1-P-1:   Atomic structure and elementary quantum mechanics   3 h

Black body radiation, heat capacities of solids, Rayleigh Jeans law, Planck's radiation law, photoelectric effect, Limitations of classical mechanics, Compton effect, de Broglie's hypothesis. Heisenberg's uncertainty principle.

S1-P-2: Gaseous State   5 h
Deviation of real gases from ideal behavior. van der Waals equation of state. Critical phenomenon. PV isotherms of real gases, continuity of state. Andrew's isotherms of CO_2. The van der Waal's equation and critical state. Derivation of relationship between critical constants and van der Waal's constants. The law of corresponding states, reduced equation of states. Joule Thomson effect and inversion temperature of a gas. Liquifaction of gases: i) Linde's method based on Joule Thomson effect ii) Claude's method based on adiabatic expansion of a gas.

S1-P-3: Liquid State and Solutions   4 h
Liquid State
Intermolecular forces, structure of liquids (qualitative description). Structural differences between solids, liquids and gases. Surface tension and its determination using stalagmometer. Viscosity of a liquid and determination of coefficient of viscosity using Ostwald viscometer. Effect of temperature on surface tension and coefficient of viscosity of a liquid (qualitative treatment only).
Solutions   3 h
Liquid - liquid mixtures, ideal liquid mixtures**,** Raoult's and Henry's laws. Non ideal systems. Azeotropes: HCl-H_2O and C_2H_5OH - H_2O systems. Fractional distillation. Partially miscible liquids: Phenol – Water, Trimethyl amine – Water and Nicotine – Water systems.

Unit - IV (General Chemistry)   15h(1 hr/week)

S1-G-1. General Principles of Inorganic Qualitative Analysis   6 h

Anion analysis: Theory of sodium carbonate extract,classification and reactions of anions- CO_3^{2-}, Cl^-, Br^-, SO_4^{2-}, PO_4^{3-}, BO_3^{3-}, CH_3COO^-, NO_3^-. Interfering ions. Cation Analysis: Principles involved - Solubility product, common ion effect, general discussion for the separation and identification of group I individual cations (Hg_2^{2+}, Ag^+, Pb^{2+}) with flow chart and chemical equations. Principle involved in separation of group II & IV cations. General discussion for the separation and identification of group II (Hg^{2+}, Pb^{2+}, Bi^{3+}, Cd^{2+},Sb^{3+}), III (Al^{3+}, Fe^{3+}), IV (Mn^{2+}, Zn^{2+}) individual cations with flow chart and chemical equations. General discussion for the separation and identification of group V individual cations (Ba^{2+}, Sr^{2+}, Ca^{2+}) with flow chart and chemical equations. Theory of flame test. Identification of Group VI cations (Mg^{2+}, NH_4^+).

S1-G-2. Isomerism   5 h

Isomerism: Definition of isomers. Classification of isomers: Constitutional and Stereoisomers - definition and examples. Constitutional isomers: chain, functional and positional isomers. Stereoisomers: enantiomers and diastereomers – definitions and examples. Representation of stereoisomers – Wedge, Fischer projection, Sawhorse, Newmann formulae.

Conformational analysis : Classification of stereoisomers based on energy. Definition and examples Conformational and configurational isomers. Conformational analysis of ethane, n-butane, 1,2- dichloroethane,2-chloroethanol .Cyclic compounds: Baeyer's strain theory, Conformational analysis of cyclohexane

Cis-trans isomerism: E-Z-Nomenclature

S1-G-3: Solid state Chemistry   4 h

Laws of Crystallography: (i) Law of Constancy of interfacial angles (ii) Law of Symmetry-Symmetry elements in crystals (iii) Law of rationality of indices. Definition of space lattice, unit cell. Bravais Lattices and Seven Crystal systems (a brief review). X-ray diffraction by crystals; Derivation of Bragg's equation. Determination of structure of NaCl, KCl and CsCl (Bragg's method and Powder method).

References
General reference: B.Sc I Year Chemistry : Semester I, Telugu Academy publication, Hyd
Unit- I
1. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications 1996.
2. Concise Inorganic Chemistry by J.D. Lee 3rd edn.
3. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3rd edn
   Wiley Publishers 2001. Chem.

5. Inorganic Chemistry Principles of structure and reactivity by James E.Huhey, E.A. Keiter and R.L. Keiter 4th edn.
6. Chemistry of the elements by N.N.Greenwood and A. Earnshaw Pergamon Press 1989.
7. Inorganic Chemistry by Shriver and Atkins 3rd edn Oxford Press 1999.
9. Textbook of Inorganic Chemistry by R Gopalan.

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1. Principles of physical chemistry by Prutton and Marron.
2. Text Book of Physical Chemistry by Soni and Dharmahara..
3. Text Book of Physical Chemistry by Puri and Sharma.
4. Text Book of Physical Chemistry by K. L. Kapoor.
5. Physical Chemistry through problems by S.K. Dogra.
6. Text Book of Physical Chemistry by R.P. Verma.
7. Elements of Physical Chemistry byLewis Glasstone.

Unit IV
 1. Qualitative analysis by Welcher and Hahn.
2. Vogel's Qualitative Inorganic Analysis by Svehla.
3. Text Book of Organic Chemistry by Morrison And Boyd.
4. Text Book of Organic Chemistry by Graham Solomons.
5. Text Book of Organic Chemistry by Bruice Yuranis Powla.
6. Text Book of Organic Chemistry by Soni.
7.Text Book of Physical Chemistry by Soni And Dharmahara..
8. Text Book of Physical Chemistry by Puri And Sharma.
9. Text Book of Physical Chemistry by K. L. Kapoor.

Laboratory Course   45h (3 h / week)
Paper I - Qualitative Analysis - Semi micro analysis of mixtures
Analysis of two anions (one simple, one interfering) and two cations in the given mixture.
Anions: $CO_3^{2-}, SO_3^{2-}, S^{2-}, Cl^-, Br^-, I^-, CH_3COO^-, NO_3^-, PO_4^{3-}, BO_3^{3-}, SO_4^{2-}$. .
Cations: Hg_2^{2+}, Ag^+, Pb^{2+}
$Hg^{2+}, Pb^{2+}, Bi^{3+}, Cd^{2+}, Cu^{2+}, As^{3+/5+}, Sb^{3+/5+}, Sn^{2+/4+}$
$Al^{3+}, Cr^{3+}, Fe^{3+}$
$Zn^{2+}, Ni^{2+}, Co^{2+}, Mn^{2+}$
$Ba^{2+}, Sr^{2+}, Ca^{2+}$
Mg^{2+}, NH_4^+

Unit-I (Inorganic Chemistry)   15 h (1 hr/week)

S2-I-1 P-block Elements -II   7 h

Oxides: Types of oxides (a) Normal- acidic, basic amphoteric and neutral (b) Mixed (c) sub oxide d) peroxide e) superoxide. Structure of oxides of C, N, P, S and Cl - reactivity, thermal stability, hydrolysis.

Oxy acids: Structure and acidic nature of oxyacids of B, C, N, P, S, Cl and I. Redox properties of oxyacids of Nitrogen: HNO_2 (reaction with $FeSO_4$, $KMnO_4$, $K_2Cr_2O_7$), HNO_3 (reaction with H_2S, Cu), HNO_4 (reaction with KBr, Aniline), $H_2N_2O_2$ (reaction with $KMnO_4$). Redox properties of oxyacids of Phosphorus: H_3PO_2 (reaction with $HgCl_2$), H_3PO_3 (reaction with $AgNO_3$, $CuSO_4$) . Redox properties of oxyacids of Sulphur: H_2SO_3 (reaction with $KMnO_4$, $K_2Cr_2O_7$), H_2SO_4 (reaction with Zn, Fe, Cu), $H_2S_2O_3$ (reaction with Cu, Au), H_2SO_5 (reaction with KI, $FeSO_4$), $H_2S_2O_8$ (reaction with $FeSO_4$, KI). Redox properties of oxy acids of Chlorine.

Interhalogens- Classification- general preparation- structures of AB, AB_3, AB_5 and AB_7 type and reactivity.

Poly halides- Definition and structure of ICl_2^-, ICl_4^- and I_3^-.

Pseudohalogens: Comparision with halogens.

S2-I-2: Chemistry of Zero group elements   2 h

Isolation of noble gases, Structure, bonding and reactivity of Xenon compounds – Oxides, Halides and Oxy-halides. Clatherate compounds and Anomalous behavior of He (II)

S2-I-3: Chemistry of d-block elements   6 h

Characteristics of d-block elements with special reference to electronic configuration, variable valence, ability to form complexes, magnetic properties &catalytic properties. Stability of various oxidation states and standard reduction potentials. Comparative treatment of second and third transition series with their 3d analogues. Study of Ti, Cr and Cu traids. Titanium triad – electronic configuration and reactivity of +3 and +4 states – oxides and halides. Chromium triad – reactivity of +3 and +6 states. Copper triad – reactivity of +1, +2 and +3 states.

Unit - II (Organic Chemistry)   15h(1 hr/week)

S2-O-1: Halogen compounds   4 h

Classification: alkyl (primary, secondary, tertiary), aryl, aralkyl, allyl, vinyl, benzyl. Chemical reactivity - reduction, formation of RMgX, Nucleophilic substitution reactions – classification into S_N1 and S_N2. Mechanism and energy profile diagrams of S_N1 and S_N2 reactions. Stereochemistry of S_N2 (Walden Inversion) 2-bromobutane, S_N1 (Racemisation) 1-bromo-1-phenylpropane Structure and reactivity – Ease of hydrolysis - comparison of alkyl, vinyl, allyl, aryl, and benzyl halides.

S2-O-2: Hydroxy compounds and ethers 6 h

Alcohols: Preaparation: 1°, 2° and 3° alcohols using Griganard reagent, Reduction of Carbonyl compounds, carboxylic acids and esters. Physical properties: H-bonding, Boiling point and Solubility. Reactions with Sodium, HX/ZnCl$_2$ (Lucas reagent), esterification, oxidation with PCC, alk. KMnO$_4$, acidic dichromates, conc. HNO$_3$ and Oppenauer oxidation (Mechanism).

Phenols: Preapartion: (i) from diazonium salts of anilines, (ii) from benzene sulphonic acids and (iii) Cumene hydroperoxide .

Properties: Acidic nature, formation of phenoxide and reaction with R-X, electrophilic substitution; halogenations, Riemer Tiemann reaction (Mechanism), Kolbe reaction (Mechanism), Gattermann-Koch reaction, Azo-coupling reaction, Schotton-Boumann raction, Houben-Hoesch condensation, .

Ethers: Nomenclature, preparation by (a) Williamson's synthesis (b) from alkenes by the action of conc. H$_2$SO$_4$. Physical properties – Absence of Hydrogen bonding, insoluble in water, low boiling point. Chemical properties – inert nature, action of conc. H$_2$SO$_4$ and HI.

S2-O-3 Carbonyl compounds 5 h

Preparation of aldehydes & ketones from acid chloride,1,3-dithianes, nitriles and from carboxylic acids. Special methods of preparing aromatic aldehydes and ketones by (a) Oxidation of arenes (b) Hydrolysis of benzal halides Physical properties – absence of Hydrogen bonding. Reactivity of the carbonyl groups in aldehydes and ketones. Chemical reactivity: Addition of (a) NaHSO$_3$ (b) HCN (c) RMgX (d) NH$_3$ (e) RNH$_2$ (f) NH$_2$OH (g) PhNHNH$_2$ (h) 2,4-DNP (Schiff bases). Addition of H$_2$O to form hydrate , chloral hydrate (stable), addition of alcohols - hemi acetal and acetal formation. Cannizaro reaction. Oxidation reactions – KMnO$_4$ oxidation and auto oxidation, reduction – catalytic hydrogenation, mechanism of Clemmenson's reduction, Wolf-kishner reduction, Meerwein Pondoff Verly reduction. Reduction with LAH, NaBH$_4$.

Unit - III (Physical Chemistry) 15h(1 hr/week)

S2-P-1: Electrochemistry 15 h

Electrical transport – conduction in metals and in electrolyte solutions, specific conductance and equivalent conductance, measurement of equivalent conductance, variation of specific and equivalent conductance with dilution. Migration of ions and Kholrausch's law, Arrhenius theory of electrolyte dissociation and its limitations, weak and strong electrolytes, Ostwald's dilution law - its uses and limitations. Debye-Huckel-Onsagar's equation for strong electrolytes (elementary treatment only). Transport number, definition and determination by Hittorf's method for attackable electrodes. Applications of conductivity measurements: Determination of degree of dissociation, determination of Ka of acids, determination of solubility product of a sparingly soluble salt, conductometric titrations.

Electrolytic and Galvanic cells – reversible and irreversible cells, conventional representation of electrochemical cells. Electro motive force (EMF) of a cell and its measurement. Computation of EMF. Types of reversible electrodes- the gas electrode, metal-metal ion, metal-insoluble

salt and redox electrodes. Electrode reactions, Nernst equation, cell EMF and Single electrode potential, Standard Hydrogen electrode – reference electrodes (calomel electrode) – standard electrode potential, sign conventions, electrochemical series and its significance. Applications of EMF measurements. Calculation of thermodynamic quantities of cell reactions (Gibbs free energy G, Helmholtz free energy and Equilibrium constant K). Determination of pH using hydrogen electrode, glass electrode and quinhydrone electrode. Solubility product of AgCl. Potentiometric titrations.

Unit – IV (General Chemistry)   15 h (1 hr/week)

S2-G-1: Theory of Quantitative Analysis   **6 h**
Volumetric Analysis: Introduction, standard solutions, indicators, end point, titration curves, Types of titrations: i) neutralization titration- principle, theory of acid base indicators, titration curves and selection of indicators- strong acid - strong base, strong acid –weak base, weak acid-strong base and weak acid –weak base. Theory of redox titrations - internal($KMnO4$) and external indicators – use of diphenylamine and ferroin indicators. Theory of complexometric titrations – use of EBT, Murexide and Fast sulphone black indicators. Role of pH in complexometric titrations. Precipitation titrations – theory of adsorption indicators.
Gravimetric analysis- Introduction, nucleation, precipitation, growth of precipitate, filtration and washing, drying and incineration of precipitate, coprecipitation and post precipitation. Determination of Ni^{2+}

S2-G-2: Stereoisomerism   **5 h**

Optical activity: Definition, wave nature of light, plane polarised light, optical rotation and specific rotation, chiral centers. Chiral molecules: definition and criteria - absence of plane, center and S_n axis of symmetry – asymmetric and dissymmetric molecules. Examples of asymmetric molecules (Glyceraldehyde, Lactic acid, Alanine) and disymmetric molecules (trans-1,2-dichlorocyclopropane). Molecules with constitutionally symmetrical chiral carbons (Tartaric acid) Molecules with constitutionally unsymmetrical chiral carbons (2,3dibromopentane). D, L configuration – examples. R, S – configuration: Cahn-Ingold-Prelog rules, examples for asymmetric and disymmetric molecules.

S2-G-3: Dilute Solutions & Colligative Properties   **4 h**

Dilute Solutions, Colligative Properties, Raoult's law, relative lowering of vapour pressure, molecular weight determination. Osmosis - laws of osmotic pressure, its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point. Derivation of relation between molecular weight and elevation in boiling point and depression in freezing point.

References

General reference: B.Sc I Year Chemistry : Semester II, Telugu Academy publication, Hyd

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1. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications1996.
2. Concise Inorganic Chemistry by J.D. Lee 3rd edn.
3. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3rd edn Wiley Publishers 2001.
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1. Physical chemistry by P W Atkins
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3. Text Book of Physical Chemistry by Soni and Dharmahara.
4. Text Book of Physical Chemistry by Puri and Sharma
5. Text Book of Physical Chemistry by K. L. Kapoor
6. Physical Chemistry through problems by S.K. Dogra.
7. Elements of Physical Chemistry by Lewis and Glasstone.
8. Material science by Kakani & Kakani

Unit IV

1. Vogel's Text Book of Quantitative Analysis by G.H.Jeffery, J.Bassett, J.Mendham and R.C. Denney 5th edn Addison Wesley Longman Inc. 1999.
2. Quantitative Analysis by Day and Underwood Prentice Hall (India) VI Edn..
3. Nano: The Essentials by T. Pradeep, McGraw-Hill Education.
4. Chemistry of nanomaterials: Synthesis, Properties and applications by CNR Rao et.al.
5. Nanostructured Materials and Nanotechnology, edited by Hari Singh Nalwa, Academic Press
6. Practical chemistry by V K Ahluwalia, Sunitha Dhingra and AdarshGulati.

Laboratory Course   45hrs (3 h / week)

Paper II- Quantitative Analysis

Acid - Base titrations

1. Estimation of Carbonate in Washing Soda.
2. Estimation of Bicarbonate in Baking Soda.
3. Estimation of Carbonate and Bicarbonate in the Mixture.

4. Estimation of Alkali content in Antacid using HCl.

5. Estimation of NH_4^+ by back titration

Redox Titrations

1. Determination of Fe(II) using $K_2Cr_2O_7$

2. Determination of Fe(II) using $KMnO_4$ with sodium oxalate as primary standard.

3. Determination of Cu(II) using $Na_2S_2O_3$ with $K_2Cr_2O_7$ as primary standard

Complexometric Titrations

1. Estimation of Mg^{2+}

2. Estimation of Cu^{2+}

B.Sc II Yr CHEMISTRY
SEMESTER WISE SYLLABUS
SEMESTER III
Paper-III
Chemistry - III

Unit-I (Inorganic Chemistry)   15 h (1 hr/week)

S3-I-1: Chemistry of f-block elements: **5 h**
Chemistry of Lanthanides**:** Position in periodic table,Electronic structure, oxidation state, ionic and atomic radii- lanthanide contraction- cause and consequences, anomalous behavior of post lanthanides-complexation- type of donor ligands preferred. Magnetic properties-paramagnetism. Colour and spectra, f-f transitions –occurrence and separation– ion exchange method, solvent extraction.
Chemistry of actinides- general features – electronic configuration, oxidation state, actinide contraction, colour and complex formation. Comparison with lanthanides.

S3-I-2: Coordination Compounds-I   **6 h**
Simple inorganic molecules and coordination complexes. Nomenclature – IUPAC rules, 1. Coordination number, coordination geometries of metal ions, types of ligands. 2.Brief review of Werner's theory,Sidgwick's electronic interpretation and EAN rule and their limitations. (Valence bond theory (VBT) – postulates and application to (a) tetrahedral complexes $[Ni(NH_3)_4]^{2+}$, $[NiCl_4]^{2-}$ and $[Ni(CO)_4]$ (b) Square planar complexes $[Ni(CN)_4]^{2-}$, $[Cu(NH_3)_4]^{2+}$, $[PtCl_4]^{2-}$ (c) Octahedral complexes $[Fe(CN)_6]^{4-}$, $[Fe(CN)_6]^{3-}$, $[FeF_6]^{4-}$, $[Co(NH_3)_6]^{3+}$, $[CoF_6]^{3-.}$ Limitations of VBT.   3. Isomerism in coordination compounds, stereo isomerism – (a)geometrical isomerism in (i) square planar meta l complexes of the type$[MA_2B_2]$, $[MA_2BC]$, $[M(AB)_2]$, $[MABCD]$. (ii) Octahedral metal complexes of the type $[MA_4B_2]$, $[M(AA)_2B_2]$, $[MA_3B_3]$ using suitable examples, (b) Optical isomerism in (i). tetrahedral complexes $[MABCD]$, (ii). Octahedral complexes $[M(AA)_2B_2]$, $[M(AA)_3]$ using suitable examples. Structural isomerism: ionization, linkage, coordination ligand isomerism using suitable examples.

S3-I-3: Metal carbonyls and Organometallic Chemistry   **4 h**

Metal carbonyls: Preparation and properties of $Ni(CO)_4$. Structural features of $Ni(CO)_4$, $Fe(CO)_5$, $Fe_2(CO)_9$, $Fe_3(CO)_{12}$ and $Cr(CO)_6$ -18 valence electron rule.

Definition, nomenclature and classification of organometallic compounds. Methods of preparation, properties and applications of alkyl and aryl compounds of Li, Mg & Al.

Unit - II (Organic Chemistry)   15h(1 hr/week)

S3-O-1: Carboxylic acids and derivatives   **5 h**

Preparation: a) Hydrolysis of Nitriles, amides and esters. b) Carbonation of Grignard reagents. Special methods of preparation of Aromatic Acids - Oxidation of Arenes. Physical properties-hydrogen bonding, dimeric association,. Chemical properties – Reactions involving H, OH and COOH groups -salt formation, anhydride formation, Acid halide formation, Esterification (mechanism) & Amide formation. Reduction of acid to the corresponding primary alcohol - via ester or acid chloride. Degradation of carboxylic acids by Huns Diecker reaction, Schmidt reaction (Decarboxylation). Arndt – Eistert synthesis, Halogenation by Hell – Volhard - Zelensky reaction. Carboxylic acid Derivatives – Hydrolysis nand Amonolysis of acid halides, Acid anhydrides and esters (mechanism of ester hydrolysis by base and acid). Hydrolysis and dehydration of amides.

S3-O-2: Nitrohydrocarbons   **3 h**

Preparation of Nitroalkanes. Reactivity - halogenation, reaction with HNO_2 (Nitrous acid), Nef reaction, reduction. Aromatic Nitrohydrocarbons: Preparation of Nitrobenzene by Nitration. Physical properties, chemical reactivity –Reduction of Nitrobenzenes in different media.

S3-O-3: Amines, Cyanides and Isocyanides   **7 h**

Amines: classification into $1^°$, $2^°$, $3^°$ Amines and Quarternary ammonium compounds. Preparative methods – Ammonolysis of alkyl halides, Gabriel synthesis, Hoffman's bromamide reaction (mechanism). Reduction of Amides and Schmidt reaction. Physical properties. Use of amine salts as phase transfer catalysts. Chemical Properties: a) Alkylation b) Acylation c) Carbylamine reaction d) Hinsberg separation. Reaction with Nitrous acid of $1^°$, $2^°$, $3^°$ (Aliphatic and aromatic amines). Electophilic substitutions of Aromatic amines – Bromination and Nitration, oxidation of aryl and $3^°$ Amines, diazotisation. Diazonium salts: Preparation with mechanism. Synthetic importance – a) Replacement of diazonium group by – OH, X (Cl)- Sandmeyer and Gatterman reaction, by fluorine (Schiemann's reaction), by iodine, CN, NO_2, H and aryl groups. Coupling Reaction of diazonium salts. i) with phenols ii) with anilines. Reduction to phenyl hydrazines.

Cyanides and isocyanides: Structure. Preparation of cyanides from a) Alkyl halides b) from amides c) from aldoximes. Preparation of isocyanides from Alkyl halides and Amines. Properties of cyanides and isocyanides, a) hydrolysis b) addition of Grignard reagent iii)

reduction iv) oxidation.

Unit III (Physical Chemistry)   15 h (1 hr/week)

S3-P-1:Thermodynamics –I   10 h
A brief review of - Energy, work and heat units, mechanical equivalent of heat, definition of system, surroundings. First law of thermodynamics statement- various forms mathematical expression. Thermodynamic quantities- extensive properties and intensive properties, state function and path functions. Energy as a state function and exact differential. Work of expansion and heat absorbed as path function.
Expression for work of expansion, sign convention problems on first law. Heat changes at constant pressure and heat changes at constant volume. Enthalpy. Heat capacities at constant pressure and constant volume. Derivation of Cp-Cv = R. Isothermal adiabatic processes. Reversible and irreversible processes. Reversible change and maximum work. Derivation of expression for maximum work for isothermal reversible process. Problems. Internal energy of an ideal gas. Joules experiment. Joule-Thompson coefficient. Adiabatic changes in ideal gas, derivation of equation, PV^{γ}= constant. P-V curves for isothermal and adiabatic processes. Heat of a reaction at constant volume and at constant pressure, relation between ΔH and ΔV.
Variation of heat of reaction with temperature. Kirchhoff's equation and problems. Limitations of first law and need for second law. Statement of second law of thermodynamics. Cyclic process. Heat engine, Carnot's theorem, Carnot's cycle. Derivation of efficiency of heat engine. Problems. Thermodynamic scale of temperature.

S3-P-2: Thermodynamics-II   5 h
Entropy: Definition from Carnot's cycle. Entropy as a state function. Entropy as a measure of disorder. Sign of entropy change for spontaneous and non- spontaneous processes &equilibrium processes. Entropy changes in i). Reversible isothermal process, ii). Reversible adiabatic process, iii). Phase change, iv). Reversible change of state of an ideal gas. Problems. Entropy of mixing of ideal gases. Free energy Gibb's function (G) and Helmholtz'sfunction (A) as thermodynamic quantities. Concept of maximum work and network ΔG as Criteria for spontaneity. Derivation of equation ΔG =ΔH –$T\Delta S$. Significance of the equation. Gibbs equations and Maxwell relations. Variation of G with P, V and T.

Unit – IV (General Chemistry)   15 h (1 hr/week)

S3-G-1 Evaluation of analytical data   4 h
Significant figures, accuracy and precision. Errors-classification of errors- determinate and indeterminate errors, absolute and relative errors. Problems based on mean, median, range, standard deviation

S3-G-2: Carbanions-I   5 h

Introduction, acidic nature of α-hydrogens and tautomerism in carbonyl compounds, nitro hydrocarbons, ethyl acetoacetate, diethyl malonate. Terminal alkynes. Stabilty of carbanions Reactions : Aldol reaction, Perkin reaction, Benzoin condensation, haloform reaction, conversion of smaller alkynes to higher alkynes.

S3-G-3: Phase Rule   **6 h**

Statement and meaning of the terms – Phase, Component and Degrees of freedom, Gibb's Phase rule, phase equilibria of one component system – water system. Phase equilibria of two-component system – Solid-Liquid equilibria, simple eutectic –Pb-Ag system, desilverisation of lead. Solid solutions – compound with congruent melting point – Mg-Zn system and incongruent melting point – $NaCl-H_2O$ system.

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2. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications(1996).
3. Concise Inorganic Chemistry by J.D. Lee 3rd edn Van Nostrand Reinhold Company(1977)
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9. College Practical chemistry by V K Ahluwalia, Sunitha Dhingra and Adarsh Gulati Universities Press (India) Limited(2012)
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4. Text book of organic chemistry by Graham Solomons. Wiley(2015)
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6. M.S.sethi, Discovery Publishing Pvt.Ltd (2014)
7. Material science by Kakani & Kakani, New Age International(2016)
8. Physical Chemistry by Ira Levine (Author) McGraw-Hill Education; 6 edition (May 9, 2008)
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1. Text book of organic chemistry by Morrison and Boyd, Person(2009)

2. Text book of organic chemistry by Graham solomons, Wiley(2015)
3. Text book of organic chemistry by Sony, Sultan Chand & Sons; 29th edition (2012)
4. Text book of organic chemistry by Bruice yuranis Powla, (2012)
5. General Organic chemistry by Sachin kumar Ghosh, New Age Publishers Pvt Ltd (2008)

Laboratory Course

Paper III (Organic Synthesis)   **45 h (3h/week)**

1.   **Synthesis of Organic compounds:**

Acetylation: Acetylation of salicylic acid, Benzoylation of Aniline.

Aromatic electrophilic substitution: Nitration: Preparation of nitro benzene and m-dinitro benzene.

Halogenation: Preparation of p-bromo acetanilide, Preparation of 2,4,6-tribromo phenol

Oxidation: Preparation of benzoic acid from benzyl chloride.

Esterification: Preparation of n-butyl acetate from acetic acid.

Methylation: Preparation of - naphthyl methyl ether.

Condensation: Preparation of benzilidine aniline and Benzaldehyde and aniline.

Diazotisation: Azocoupling of β-Naphthol.

2. **Microwave assisted synthesis of Asprin – DEMO (demonstration only)**

.

Unit-I (Inorganic Chemistry)   15h (1 h/week)
S4-I-1: Coordination Compounds –II   11 h

Crystal field theory (CFT)- Postulates of CFT, splitting patterns of d-orbitals in ctahedral, tetrahedral, square planer with suitable examples. Crystalfield stabilization energies and its calculations for various dn configurations in octahedral complexes. High Spin Low Spin complexes. Colour and Magnetic properties of transition metal complexes. Calculations of magnetic moments spin only formula. Detection of complex formation - basic principles of various methods- change in chemical properties, solubility, colour, pH, conductivity, magnetic susceptibility.

Hard and soft acids bases (HSAB) - Classification, Pearson's concept of hardness and softness, application of HSAB principles – Stability of compounds / complexes, predicting the feasibility of reaction. Thermodynamic and kinetic stability of transition of metal complexes. Stability of metal complexes –stepwise and overall stability constant and their relationship and chelate effect determination of composition of complex by Job's method and mole ratio method.

Applications of coordination compounds: Applications of coordination compounds a) in quantitative and qualitative analysis with suitable examples b) in medicine for removal of toxic metal ions and cancer therapy c) in industry as catalysts polymerization – Ziegler Natta catalyst d) water softening.

S4-I-2:Bioinorganic Chemistry   4 h

Essential elements, biological significance of Na, K, Mg, Ca, Fe, Co, Ni, Cu, Zn and chloride (Cl-). Toxic metal ions As, Hg & Pb Oxygen transport and storage – structure of hemoglobin, binding and transport of oxygen. Fixation of CO_2 in photosynthesis- overview of light and dark reactions in photosynthesis. Structure of chlorophyll and coordination of magnesium. Electron transport in light reactions from water to NADP+ (Z – scheme).

Semester-IV

Unit - II (Organic Chemistry)   15h(1 hr/week)
S4-O-1: Carbohydrates   6 h

Introduction: Classification and nomenclature. Monosaccharides: All discussion to be confined to (+) glucose as an example of aldo hexoses and (-) fructose as example of ketohexoses. Chemical properties and structural elucidation: Evidences for straight chain pentahydroxy aldehyde structure. Number of optically active, isomers possible for the structure, configuration

of glucose based on D-glyceraldehyde as primary standard (No proof for configuration is required). Evidence for cyclic structure of glucose (Pyranose structure, anomeric Carbon and anomers). Proof for the ring size (methylation, hydrolysis and oxidation reactions). (Haworth formula and chair conformational formula). Structure of fructose: Evidence of 2 – ketohexose structure. Same osazone formation from glucose and fructose, Hydrogen bonding in osazones, cyclic structure for fructose (Furanose structure,Haworth formula).

Inter Conversion of Monosaccharides: : Arabinose to D-glucose, D- mannose (kiliani – Fischer method). Epimers, Epimerisation- Lobry de bruyn van Ekenstein rearrangement. D-glucose to D-arabinose by Ruff's degradation. Aldohexose(+) (glucose) to ketohexose (–) (fructose) and Ketohexose(Fructose) to aldohexose (Glucose).

S4-O-2: Amino acids and proteins   5 h
Classification. Methods of synthesis: General methods of synthesis of alpha amino acids (specific examples – Glycine, Alanine, Valine and Leucine) by following methods: a) From halogenated Carboxylic acid b)Malonic ester synthesis c) strecker's synthesis. Physical properties: Optical activity of naturally occurring amino acids. Zwitter ion structure – salt like character, definition of isoelectric point. Chemical properties: General reactions due to amino and carboxyl groups – Lactams from gamma and delta amino acids by heating peptide bond (amide linkage). Structure and nomenclature of peptides. Primary structure of proteins, di peptide synthesis

S4-O-3: Heterocyclic Compounds   4 h

Introduction and definition: 5 membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole. Importance of ring systems –Numbering. Aromatic character

Resonance structures: Explanation of feebly acidic character of pyrrole, electrophillic substitution, Halogenation, Nitration and Sulphonation. Reactivity of furan as 1,3-diene, Diels Alder reactions (one example). Sulphonation of thiophene purification of Benzene obtained from coal tar). Preparation of furan, Pyrrole and thiophene Paul-Knorr synthesis. Structure of pyridine, Basicity – Aromaticity – Comparison with pyrrole – preparation by Hantsch method and properties – Reactivity towards Nucleophilic substitution reaction – chichibabin reaction.

Unit III (Physical Chemistry)   15h (1 hr/week)

S4-P-1: Chemical Kinetics   11 h
Introduction to chemical kinetics, rate of reaction, variation of concentration with time, rate laws and rate constant. Specific reaction rate. Factors influencing reaction rates: effect of concentration of reactants, effect of temperature, effect of pressure, effect of reaction medium, effect of radiation, effect of catalyst with simple examples. Order of a reaction.
First order reaction, derivation of equation for rate constant. Characteristics of first order reaction. Units for rate constant. Half- life period, graph of first order reaction, Examples-
Decomposition of H_2O_2 and decomposition of oxalic acid, Problems.
Pseudo first order reaction, Hydrolysis of methyl acetate, inversion of cane sugar, problems. Second order reaction, derivation of expression for second order rate constant, examples-

Saponification of ester, $2O_3 \rightarrow 3O_2$, $C_2H_4 + H_2 \rightarrow C_2H_6$. Characteristics of second order reaction, units for rate constants, half- life period and second order plots. Problems

S4-P-2: Photochemistry **4 h**

Introduction to photochemical reactions, Difference between thermal and photochemical reactions, Laws of photo chemistry- Grotthus Draper law, Stark–Einstein's Law of photochemical equivalence. Quantum yield. Examples of photo chemical reactions with different quantum yields. Photo chemical combinations of H_2–Cl_2 and H_2–Br_2 reactions, reasons for the high and low quantum yield. Problems based on quantum efficiency. Consequences of light absorption. Singlet and triplet states. Jablonski diagram. Explanation of internal conversion, inter- system crossing, phosphorescence, fluorescence.

Unit III (General Chemistry) 15h (1 hr/week)

S4-G-1: Theories of bonding in metals **4 h**

Valence bond theory, Explanation of metallic properties and its limitations, Free electron theory, thermal and electrical conductivity of metals, limitations, Band theory, formation of bands, explanation of conductors, semiconductors n-type and p-type, extrinsic & intrinsic semiconductors, and insulators**.**

S4-G-2: Carbanions-II **5 h**

Mannich reaction , Michael addition and Knoevengeal condensation Synthetic applications of Aceto acetic ester. Acid hydrolysis and ketonic hydrolysis: Preparation of ketones, monocarboxylic acids and dicarboxylic acids Malonic ester– synthetic applications. Preparation of (i) substituted mono carboxylic acids and (ii) substituted dicarboxylic acids.

S4-G-3: Colloids & Surface Chemistry **6 h**

Definition of colloids. Classification of colloids. Solids in liquids (sols): preparations and properties – Kinetic, Optical and Electrical stability of colloids. Protective action. Hardy–Schultz law, Gold number. Liquids in liquids (emulsions): Types of emulsions, preparation and emulsifier. Liquids in solids(gels): Classification, preparations and properties, General applications of colloids.

Adsorption: Types of adsorption. Factors influencing adsorption. Freundlich adsorption isotherm. Langmuir theory of unilayer adsorption isotherm. Applications.

References

General reference: B.Sc II Year Chemistry : Semester IV, Telugu Academy publication, Hyd
Unit- I
1. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications (1996).
2. Concise Inorganic Chemistry by J.D. Lee 3rd edn. Van Nostrand ReinholdCompany(1977)
3. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3rd edn Wiley Publishers (2001).
4. Inorganic Chemistry Principles of structure and reactivity by James E.Huhey, E.A. Keiter and R.L. Keiter 4th edn. (2006)
5. Chemistry of the elements by N.N.Greenwood and A. Earnshaw Pergamon Press(1989).
6. Inorganic Chemistry by Shriver and Atkins 3rd edn Oxford Press (1999).
7. Textbook of Inorganic Chemistry by R Gopalan, Universities Press,(2012)

Unit- II
1. Text book of organic chemistry by Soni. Sultan Chand & Sons; Twenty Ninthedition (2012)
2. General Organic chemistry by Sachin Kumar Ghosh. New Age Publishers Pvt Ltd (2008)
3. Text book of organic chemistry by Morrison and Boyd. Person(2009)
4. Text book of organic chemistry by Graham Solomons. Wiley(2015)
5. Text book of organic chemistry by Bruice Yuranis Powla. **(2012)**
6. Text book of organic chemistry by C N pillai CRC Press (2012)
8. Organic Chemistry by L. G. Wade Jr.
9. Organic Chemistry by M. Jones, Jr
10. Organic Chemistry by John McMurry.

Unit III
1. Principles of physical chemistry by Prutton and Marron. The MacmillanCompany; 4th edn. (1970)
2. Text Book of Physical Chemistry by Soni and Dharmahara. Sulthan Chand &sons.(2011)
3. Text Book of Physical Chemistry by Puri and Sharma. S. Nagin chand and Co.(2017)
4. Text Book of Physical Chemistry by K. L. Kapoor. (2012)
5. Physical Chemistry through problems by S.K. Dogra. (2015)
6. Text Book of Physical Chemistry by R.P. Verma.
7. Elements of Physical Chemistry byLewis Glasstone. Macmillan (1966)
8. Industrial Electrochemistry, D. Pletcher, Chapman & Hall, London, 1990
Unit IV
1. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications(1996).
2. Concise Inorganic Chemistry by J.D. Lee 3rd edn. Van Nostrand Reinhold Company (1977)
3. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3rd edn Wiley Publishers (2001).
4. Inorganic Chemistry Principles of structure and reactivity by James E.Huhey, E.A. Keiter and R.L. Keiter 4th edn. (2006)
5. Text book of organic chemistry by Morrison and Boyd, Person (2009)
6. Text book of organic chemistry by Graham solomons, Wiley (2015)
7. Fundamentals of organic synthesis and retrosynthetic analysis by Ratna Kumar Kar, CBA,(2014)
8. Organic synthesis by Dr. Jagadamba Singh and Dr. L.D.S. Yadav, Pragati   Prakashan, 2010
7. Stereochemistry of organic compounds by D. Nasipuri, New Academic Science Limited, 2012
8. Organic chemistry by Clayden, Greeves, Warren and Wothers, Oxford University Press, 2001
9. Fundamentals of Asymmetric Synthesis by G. L. David Krupadanam, Universities, Press 2014

Laboratory Course
Paper IV-
Qualitative Analysis of Organic Compounds: 45hrs (3 h/week)
Qualitative analysis: Identification of organic compounds through the functional group analysis - ignition test, determination of melting points/boiling points, solubility test, functional group tests and preparation of suitable derivatives of the following: Carboxylic acids, phenols, amines, urea, thiourea, carbohydrates, aldehydes, ketones, amides, nitro hydrocarbons, ester and naphthalene.

B.Sc. Chemistry II Year Semester-III
Skill Enhancement Course- I <mark>(SEC-I)</mark> (2 Credits)
Rules in Chemistry Laboratory and Lab Reagents

Unit I: Laboratory Safety Rules and Regulations   15 h (1 hr/week)

General rules and regulations for lab safety: Minimizing Risks of Hazards, Personal Protective Equipment (PPE) - Hair, Dressing for the Laboratory, Eye Protection, Eyewash fountain, Gloves, Laboratory Protocols, Labeling Chemicals, Careful reading of labels Prevention of Inhaling Harmful Chemicals, Guide to Chemical Hazards, Chemical Spills etc,. Accidents use of fire extinguisher and first aid kit in the laboratory, safety symbols- Preparation of the charts by the students and display of chats in chemistry labs. Calibration of fractional weights, calibration of glass ware - burette, pipette, standard flask, Normality/Molarity and specific gravity of concentrated acids – Preparation of dilute solutions (Numerical problems). Precautions to be taken in the preparation of dilute acids and bases and bases. Preparation of stock solutions of salts with specific examples. Properties of primary standard salt and preparation of standard solution. Good laboratory practices-maintenance of observation book record.

UNIT 2: Preparation of Lab Reagents   15 h (1 hr/week)

Preparation of indicators and use of indicators in volumetric analysis- acid base titrations, redox titrations, precipitation titrations and complexometric titrations. Role of an indicator in detecting end point (Phenolphthalein, Methyl orange, Methyl-red, Potassium Chromate, Diphenylamine, EBT, Murexide, etc). Preparation of buffers – pH 10 ammonical buffer and acetate buffer solutions. Preparation of commonly used reagents : Ammonium hydroxide solution, Ammonium molybdate reagent, Ammonium hydrogen phosphate solution, Bayer's reagent, Benedict's solution, Bromine water, Dimethyl glyoxime reagent, 2,4-Dinitrophenyl hydrazine reagent, Eriochrome black-T reagent Fehling solution, Ferric chloride solution, Ferrous sulphate solution, Iodine solution, Molisch's reagent, Nessler's reagent, Neutral FeCl3, Schiff's reagent, Silver nitrate solution, Sodium carbonate solution , Sodium hydroxide (Caustic soda) solution, Starch solution, Tollen's reagent. (reference work and submission of assignments). Charts preparation depicting course content.

RECOMMENDED BOOKS

1. Vogel's Text Book of Quantitative Chemical Analysis, 5th edition.
2. Vogel's Text Book of macro and semimicro qualitative inorganic analysis. G. Svehla, 5th edition.
3. Chemistry Reagent Manual Prepared by Chemistry Department, SGTB Khalsa College under DBT's Star College Scheme, University of Delhi (Available: online)
4. American Chemical Society Safety in Academic Chemistry Laboratories 8th edition.

[Course objectives (CO)]: To improve the skills of students in the application of theory and practical knowledge. To fill the gap between theory and practicals. To train the students in understanding laboratory safety rules and to improve the skills in preparation of laboratory reagents]

B.Sc. Chemistry II Year
Semester III
Skill Enhancement Course- II <mark>(SEC –II)</mark> (2 Credits)
REMEDIAL METHODS FOR POLLUTION, DRINKING WATER AND SOIL FERTILITY STANDARDS

UNIT I: Remedial Methods for Pollution Prevention and control of air pollution   15 h (1 hr/week)

Ozone hole-causes and harm due to ozone depletion. The effect of CFC's in Ozone depletion and their replacements. Global Warming and Greenhouse Effect Precautions to control global warming. Deleterious effect of pollutants - Endangered Monuments- acid rain. Precautions to protect monuments. Sources of Radiation pollution - Chernobyl accident and its Consequences. Radiation effect by the usage of cell phones and protection tips. Deleterious effects of cell phone towers and health hazards.

Sources of water pollution-(i). Pollution due to pesticides and inorganic chemicals, (ii). Thermal pollution (iii). Ground water pollution (iv). Eutrophication.

Methods for control of water pollution and water recycling. Dumping of plastics in rivers & oceans and their effect on aquatic life. Determination of (i) Dissolved Oxygen and (ii) Chemical Oxygen Demand in polluted water - Illustration through charts (or) demonstration of experiments. Sources of soil pollution (i). Plastic bags, (ii). Industrial and (iii). Agricultural sources. Control of soil pollution. Environmental laws in India. Environmental benefits of planting trees.

UNIT II: Drinking Water and Soil Fertility Standards and Analysis
15 h (1 hr/week)

Water Quality and Common Treatments for Private Drinking Water Systems: Drinking Water Standards-Primary Drinking Water Standards : Inorganics, Organics and Volatile Organic Chemicals. Secondary Drinking Water Standards-Inorganics and Physical Problems. Water Testing, Mineral Analysis, Microbiological Tests, Pesticide and Other Organic Chemical Tests. Principle involved in Water Treatment Techniques. (i) Reverse osmosis (ii) Disinfection methods such as chlorination, ultraviolet light, ozonation etc (iii) Chemical oxidation and (iv) Ion exchange (water softeners). Visit to nearby drinking water plants and interaction at sites.

Introduction to Soil Chemistry- Basic Concepts. Effect of pH on nutrient availability. Macronutrients and their effect on plants -Carbon, Hydrogen, Oxygen, Nitrogen and Phosphorus other macronutrients-Calcium, Magnesium and Sulfur. Micronutrients and their effect on plants. Boron ($B_4O_7^{2-}$), Copper (Cu^{2+}), Iron (Fe^{2+}, Fe^{3+}) Manganese (Mn^{2+}) Molybdenum (MoO_4^{2-}) Zinc (Zn^{2+}) Cobalt (Co^{2+}) Chlorine (Cl^-) and Others. Determination of soil nitrogen by Kjeldahl method- Illustration through charts (Or) demonstration of experiment. Visit to nearby agricultural forms and interaction with farmers. Discussion with farmers on the use of Soil Analysis Kits.

References

1. A Text book for 'Remedial methods for pollution, drinking water and soil fertility standards', First Edition, Authors: Dr Mudvath Ravi, Gopu Srinivas, Putta Venkat Reddy, Vuradi Ravi Kumar, Battini Ushaiah, ISBN No. 978-93-5311-183-0.

2. Remedial methods for pollution, drinking water and soil fertility standards, Author: Dr G. Vanjatha.

3. Remedial methods for pollution, drinking water and soil fertility standards, Telugu version, Authors: Dr N. Yogi Babu, Dr. G. Vanajatha, M. Srilatha.

4. Environmental Pollution, download.nos.org/333courseE/10.pdf

5. CFC Replacements, butane.chem.uiuc.edu/pshapley/Environmental/L21/3.html

6. Effects of Acid Rain on Buildings www.air-quality.org.uk/12.php

7. Acid Rain Effects - Buildings - Chemistry chemistry.elmhurst.edu/vchembook/196buildings.html 8. How to protect national heritage - ways to protect monuments www.youthkiawaaz.com/2011/03/how-to-protect-national-heritage/.

9. Chernobyl nuclear power plant accident - NRC www.nrc.gov/reading-rm/doc-collections/fact-sheets/chernobyl-bg.pdf

10. Side-effects of harmful radiation from mobile phones and towers pib.nic.in/newsite/printrelease.aspx?relid=116304

11. Cell Phone Radiation Protection - Highly Effective Tips https: www.electricsense.com/775/how-to-protect-yourself-from-cell-phone-radiation/

12. Chemical Waste That Impact on Aquatic Life or Water Quality blog.idrenvironmental.com/chemical-waste-that-impact-on-aquatic-life-or-waterquality

13. Trees and Your Environment - Clean Air Gardening www.cleanairgardening.com/plantingtrees 14.water quality and common treatments for private drinking water . extension.uga.edu/publications/detail.html?number=b939

15. Soil chemistry https://casfs.ucsc.edu/about/publications/Teaching-Organic-Farming/PDFdownloads/2.2-soil-chemistry.pdf

16. Soil Analysis-Determination of Available Nitrogen ... - Amrita Virtual Lab vlab.amrita.edu/?sub=2&brch=294&sim=1551&cnt=1

17. Determination of dissolved oxygen (DO) www.cutm.ac.in/pdf/env%20engg%20lab%20manual.pdf 18. Determination of chemical oxygen demand of wastewater www.pharmaguideline.com › quality control › test

B.Sc. Chemistry II Year
Semester - IV
Skill Enhancement Course- III (SEC - III) (2 Credits)
Materials and their Applications

Unit – I: Types of Materials   15 h (1 hr/week)
Introduction: Materials and their importance. Classification of Materials, Advanced materials and their need. Types of Materials: Metals, ceramics, polymers and composites; Nature of bonding (Type of bond present). Types and applications of metal alloys: Classification- ferrous and non-ferrous alloys. Ferrous alloys -types and their applications. Non-ferrous alloys – Cu, Al, Ti alloys, their applications and super alloys.
Field Work- Collection of Metal Alloy Samples.

Types and Applications of Ceramics: Classification of Ceramics based on their application- glasses, clay products, refractories, abrasives, cements, and advanced ceramics. Glasses: Compositions and Characteristics of Some of the Common Commercial Glasses; Properties and applications of glass ceramics - preparation of charts depicting various types of glass and their use. Clay products: Structural clay products and the white wares. Refractories: Compositions of four Common Ceramic Refractory Materials, fireclay, silica, basic refractories ex. MgO and special refractories ex. Alumina and Zirconia Cements: Classification, preparation of cement and the setting process; quick setting cements; applications.
Field Work-Visit to industries and collection of samples of materials

Unit – II: Types of Polymers and Applications   15 h (1 hr/week)
Classification of Polymeric materials based on application: Coatings, adhesives, films, foams with examples Polymer Additives: Fillers, Plasticizers, Stabilizers, Colorants, Flame Retardants with examples.
Advanced Materials: Types of advanced materials - semiconductors, bio-compatible materials, smart materials, advanced polymeric materials and nano-engineered materials. Biocompatible materials: Definition. Materials used as biomaterials and their properties. Metals and alloys used in bone and joint replacement. Filling and restoration materials – dental cements, dental amalgams, dental adhesives.
Field Work- Visit to Dental Clinics and interaction with Doctors regarding materials used in Dental treatments.
Smart materials: Shape memory alloys- definition and examples (Ni-Ti alloys, Cu based alloys), applications. Conducting polymers: - Introduction, Electrically conducting polymers and their uses (polyaniline, polypyrrole, polyacetylene and polythiophene).

References
1.William D. Callister Materials Science and Engineering An Introduction, John Wiley & Sons, Inc, 2006.
2. Material science by Kakani and Kakani.
3.Sujata V., Bhat., ―Biomaterials‖, Narosa Publication House, New Delhi, 2002.
4.M. V. Gandhi and B. S. Thompson, ―Smart Materials and Structures‖, Chapman and Hall, London, First Edition, 1992.
5 Duerig,T. W., Melton, K. N, Stockel, D. and Wayman, C.M., ―Engineering aspects of Shapememory Alloys‖, Butterworth – Heinemann, 1990.
6. Conducting Polymers, Fundamentals and Applications A Practical Approach Authors: Chandrasekhar, Prasanna Ashwin-Ushas Corp., Inc. Kluwer Academic Publishers. Boston

B.Sc. Chemistry II Year Semester IV
Skill Enhancement Course- IV <mark>(SEC - IV)</mark> (2 Credits)
Chemistry of Cosmetics and Food Processing

Unit-I: Chemistry of Cosmetics and Perfumes

A general study including preparation and uses of the following: Hair dye, hair spray, shampoo, sunscreen lotions, lipsticks, talcum powder, nail enamel, creams (cold, vanishing and shaving creams), antiperspirants and artificial flavours. Essential oils and their importance in cosmetic industries with reference to eugenol, geraniol, sandalwood oil, eucalyptus, 2-phenyl ethyl alcohol. Demonstration experiments or illustration of experimental procedures through charts for the preparation of talcum powder, shampoo and vanishing cream. Analysis of deodorants and antiperspirant - Aluminum, Zinc, Boric acid, Chloride and Sulphide.

Unit-II: Food Processing and Food Adulteration

Food processing: Introduction, methods for food processing, additives and preservatives. Food processing- impact on nutrition, analysis of calcium in milk by complexometric titration, spectrophotometric analysis of iron in foods, Spectrophotometric identification and determination of caffeine and benzoic acid in soft drinks. Field Work -Visit to Food Industries. Food adulteration: Adulterants in some common food items and their identification: Pulses, chilli powder, turmeric powder, milk, honey, spices, food grains and wheat flour, coffee powder, tea leaves, vegetable oil, ghee, ice creams, tomato sauce. Field Work-Collection of adulterated food samples, demonstration of a minimum of five experiments for testing adulterants in food items.

References

1. E. Stocchi: Industrial Chemistry, Vol -I, Ellis Horwood Ltd. UK.
2. P.C. Jain, M. Jain: Engineering Chemistry, Dhanpat Rai & Sons, Delhi
3. Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996).
4. Rameen Devi, Food Processing and Impact on Nutrition, Sc J Agric Vet Sci., AugSep 2015; 2(4A):304-311.
5. W.A. Poucher, Perfumes, Cosmetics and Soaps (1993).
6. Srilakshmi, Food Science. Edition: 3rd (2004). 7. Lillian Hoagland Meyer, Food chemistry (2008).
8. Handbook of Analysis and Quality Control for Fruit and Vegetable Products,S. Ranganna, Tata McGraw-Hill Education, 1986 – Food.
9. Fundamental concepts of applied chemistry J.C Ghosh, S. Chand and Co, Ltd, New Delhi.
10. Applied Chemistry K .Bhagavathi Sundhar, MJP publishers.

Telangana State Council of Higher Education, Govt. of Telangana B.Sc, CBCS Common Core Syllabi for all Universities in Telangana

PROPOSED SCHEME FOR CHOICE BASED CREDIT SYSTEM IN B.Sc., Chemistry (for the batch admitted in 2019-2020)

	THIRD YEAR- SEMESTER V			
CODE	COURSE TITLE	COURSE TYPE	HPW	CREDITS
BS 501	Chemistry of Cosmetics, Food Processing, Drugs and Pharmaceuticals	GE	4	4
BS 502	English	CC-1E	3	3
BS 503	Second language	CC-2E	3	3
BS 504	Optional- I A/B	DSE -1E	------	4+1=5
BS 505	Optional- II A/B	DSE -2E	------	4+1=5
BS 506	Optional- III A/B A. Spectroscopy and Chromatography (or) B. Metallurgy, Dyes and Catalysis Laboratory Course -V Experiments in Physical Chemistry-I	DSE -3E	4T 3P } = 7	4 1 } =5
	TOTAL			25

	THIRD YEAR- SEMESTER VI			
BS 601	Project in Chemistry/ Advanced Chemistry			4
BS 602	English	CC-1F	3	3
BS 603	Second language	CC-2F	3	3
BS 604	Optional- I A/B	DSE-1F	--------	4+1=5
BS 605	Optional- II A/B	DSE -2F	--------	4+1=5
BS 606	Optional- III A/B A. Medicinal Chemistry (or) B. Agricultural and Fuel Chemistry Laboratory Course -VI Experiments in Physical Chemistry-II	DSE -3F	4T 3P } = 7	4 1 } = 5
	TOTAL			25
	TOTAL Credits			150

Generic Elective (GE) Course - I (4 Credits)
(for B.Sc. Non Chemistry/B.A/B.Com Students)
Chemistry of Cosmetics, Food Processing, Drugs and Pharmaceuticals   60Hrs

Unit-I: Chemistry of Cosmetics and Perfumes   15 Hrs

A general study including preparation and uses of the following: Hair dye, hair spray, shampoo, sunscreen lotions, lipsticks, talcum powder, nail enamel, creams (cold, vanishing and shaving creams), antiperspirants and artificial flavours. Essential oils and their importance in cosmetic industries with reference to eugenol, geraniol, sandalwood oil, eucalyptus, 2-phenyl ethyl alcohol.

Demonstration experiments or illustration of experimental procedures through charts for the preparation of talcum powder, shampoo and vanishing cream. Chemistry and Applications of deodorants and antiperspirant - Aluminum, Zinc, Boric acid, Chloride and Sulphide.

Unit-II: Food Processing and Food Adulteration   15 Hrs

Food processing: Introduction, methods for food processing, additives and preservatives. Food processing- impact on nutrition,

Food adulteration: Adulterants in some common food items and their identification: Pulses, chilli powder, turmeric powder, milk, honey, spices, food grains and wheat flour, coffee powder, tea leaves, vegetable oil, ghee, ice creams, tomato sauce.

Food Packaging: Definition and function of packaging-Classification of packaging materials-different types of packaging materials such as glass, wood, metal, paper, wood, plastic etc., - advantages and disadvantages of each packaging material. Packaging materials and systems: corrugated fibre board boxes, shrink bundles and reusable packages. Effect of packaging materials on nutritive values of food.

Food labelling: Introduction, need and importance.

Unit – III: General Characteristics of Drugs   15Hrs

Introduction: Diseases – causes of diseases, Drug – definition and sources.

ADME of drugs (brief) – Absorption, distribution, drug metabolism (in liver), elimination (brief). Toxicity.

Examples (i) Zintac (Ranitidine, antacid) (ii) Paracetamol (antipyretic) (iii) Benadryl (Cough syrup). Characteristics of an ideal drug.

Nomenclature of Drugs: chemical name – generic name – trade name. Trade names for the given generic names – (i) Aspirin (ii) Amoxycillin (iii) Ciprofloxacin (iv) Paracetamol (v) Mebendazole

Drug formulations: Definition – need for conversion of drug into pharmaceutical (drug formulations) – Additives – diluents, binders, lubricants, antioxidants, flavourants, sweeteners, colourants, coating agents. Classification of Drug formulations: oral, parenterals and topical dosage forms –

advantages and disadvantages.

(i) Oral Dosage forms: Tablets (Aspirin – analgesic; Ciprofloxacin - antibacterial). Capsules (Amoxycillin – antibiotic; Omeprazole-antacid). Syrups (B-complex syrup; Benadryl- Cough syrup).

(ii) Parenterals (Injection forms): Propranolol (antihypertensive), Heparin (anticoagulant)

(iii) Topical dosage forms: Creams and Ointments

(iv) Antiallergic: Aclometasone (Aclovate), Betamethasone valerate(2%) Multiple purposes,

(v) Anti-itching: Doxepin Zonalon), Antifungal: Miconozole (Dactarin, Neomicol), Ketoconazole, (Nizoral Cream), Fluconazole, Anesthetic- Lidocaine, (Lidocaine ointment) and Antiseptic: Boro Plus Cream, For burns -Iodine ointment

Unit – IV: Classification of Drugs   15Hrs

Classification of drugs based on therapeutic action-Chemotherapeutic agents, Pharmacodynamic agents and drugs acting on metabolic processes.

Brief explanation for the following:

(i) Chemotherapeutic agents: Antimalarials – Chloroquine; Antibiotic – Amoxicillin; Antitubercular drugs – isoniazide; Antiprotozoals – metronidazole.

(ii) Pharmacodynamic agents

(a) Drugs acting on CNS: Diazepam (CNS depressant), General anesthetic (thiopental sodium), antipyretic and analgesic (Iburofen)

(b) Drugs acting on PNS: local anaesthetics (Benzocaine)

(c) Drugs acting on cardiovascular system: Metoprolol (antihypertensive agents), Nefidipine antianginal and antihypertensive agent)

(d) Drugs acting on renal system: Diuretics (Acetazolamide)

(iii) Drugs acting on metabolic processes

(a) Vitamins: Common name, source, deficiency, vitamin A, B2, B6, C, D, E and K – remedy

(b) Hormones: Function (brief) - deficiency of hormones (Insulin, Testosterone and Osterone)

Recommended Text Books and Reference Books

1. Industrial Chemistry, Vol -I, E. Stocchi, Ellis Horwood Ltd. UK.
2. Engineering Chemistry, P.C. Jain, M. Jain, Dhanpat Rai & Sons, Delhi.
3. Industrial Chemistry, Sharma, B.K. & Gaur, H. , Goel Publishing House, Meerut (1996).
4. Food Processing and Impact on Nutrition, Rameen Devi, Sc J Agric Vet Sci., Aug-Sep 2015; 2(4A):304-311.
5. Perfumes, Cosmetics and Soaps , W.A. Poucher, (1993).
6. A first course in food analysis by A Y Sathe
7. Food Science by N.Potter, CBS publishers
8. Food chemistry, Lillian Hoagland Meyer, (2008).
9. A Handbook of food packaging by F. A. Paine and H.Y. Paine.
10. Fundamental concepts of applied chemistry J.C Ghosh, S. Chand and Co, Ltd, New Delhi.
11. Applied Chemistry K .Bhagavathi Sundhar, MJP publishers.
12. Drugs by G.L.David Krupadanam, D.Vijaya Prasad, K.Varaprasad Rao, K.L.N.Reddy, C.Sudhakar , Universities Press (India) Limited 2007.
13. An Introduction to Medicinal Chemistry by Graham L. Patrick, Oxford University Press, New York. 1995

B.Sc. Chemistry III Year
Semester-V, Paper-V
Discipline Specific Elective- A (4 Credits)
Spectroscopy and Chromatography   60Hrs

Unit I: Molecular spectroscopy   15Hrs
S5-E-A-I: Introduction to electromagnetic radiation, interaction of electromagnetic radiations with molecules, various types of molecular spectra.

Rotational spectroscopy (Microwave spectroscopy)
Rotational axis, moment of inertia, classification of molecules (based on moment of inertia), rotational energies, selection rules (No derivation), Determination of bond length of rigid diatomic molecules eg. HCl.

Infra red spectroscopy
Energy levels of simple harmonic oscillator, molecular vibration spectrum, selection rules. Determination of force constant (Problems). Qualitative relation of force constant to bond energies. Anharmonic motion of real molecules and energy levels. Modes of vibrations in polyatomic molecules. Characteristic absorption bands of various functional groups. Finger print nature of infrared spectrum.

Electronic spectroscopy
Bonding and antibonding molecular orbitals,electronic energy levels of molecules (σ, π, n), types of electronic transitions:σ-σ^*, n-σ^*, n-π^*, π-π^* with suitable examples. Selection rules, Terminology of chromophore, auxochrome, bathochromic and hypsochromic shifts. Absorption of characteristics of chromophones: diene, enone and aromatic chromophores. Representation of UV-visible spectra. General features of absorption – spectroscopy, transmittance, absorbance, and molar absorptivity. Beer Lambert's law and its limitations.

Unit II: NMR and Mass Spectrometry   15Hrs
S5-E-A-II: Proton Magnetic Resonance Spectroscopy
Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, factors affecting chemical shifts, NMR splitting of signals – spin-spin coupling, representation of proton NMR spectrum – Integrations. ^{1}H NMR spectrum of – ethyl bromide, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate and acetophenone.

Mass Spectrometry
Electron Impact Mass: Basic principles, Nitrogen rule, types of ions: Molecular ion and fragment ions. Representation of mass spectrum, types of peaks (molecular ion peak, base peak and isotopic ion peaks). Determination of molecular formula. Mass spectrum of ethyl chloride, ethyl bromide and acetophenone.

Unit III: Separation techniques - I   15Hrs
S5-E-A-III: Solvent Extraction- Principle, Methods of extraction: Batch extraction, continuous extraction and counter current extraction. Application – Determination of Iron(III). **Chromatography:** Classification of chromatographic methods, principles of differential migration, adsorption phenomenon, nature of adsorbents, solvent systems.
Thin layer Chromatography (TLC): Advantages, preparation of plates, Solid phase and mobile phase used in TLC, eluotopic series, development of the chromatogram, Detection of the spots, visualizing agents, factors effecting Rf values and applications of TLC.

Paper Chromatography: Principle, choice of paper and solvent systems, development of chromatogram – ascending, descending, radial and two dimensional chromatography, detection of spots, and applications of paper chromatography.

Unit IV: Separation techniques - II
15Hrs

S5-E-A-IV: Column Chromatography- Principle, Types of stationary phases, Column packing – Wet packing technique, Dry packing technique. Selection criteria of mobile phase solvents for eluting polar, non-polar compounds and its applications.

Ion exchange chromatography: Principle, cation and anion exchange resins, its application in separation of ions, de-ionized water.

Gas Chromatography: Principle, theory and instrumentation (Block Diagram), Types of stationary phases and carrier gases (mobile phase), applications of GC.

High performance liquid chromatography: Principle, theory and instrumentation, stationary phases and mobile phases. Applications of HPLC, Analysis of paracetamol.

Recommended Text Books and Reference Books

1. Fundamentals of Molecular Spectroscopy, Banwell & McCash
2. Organic spectroscopy, William Kemp, Palgrave Macmillan; 2nd Revised edition
3. Spectroscopy, B K Sharma Krishna Prakashan Media, 1981
4. Elements of Organic Spectroscopy, Y R Sharma.
5. Applications of Absorption Spectroscopy of Organic Compounds (English, Paperback, Dyer R. John)
6. Organic Chemistry, Morrison and Boyd, Pearson Publications.
7. Introduction to Spectroscopy by Donald Pavia, Gary Lampman and George Kriz. Saunders College Division,2001
8. Chemistry text book for B.Sc., published by Telugu Academy, Govt. of Telangana.
9. Analytical Chemistry by David Krupadanam, Universities Press (India) Limited.
10. Principles of Instrumental Analysis, D.A. Skoog, F.J. Holler, T.A. Nieman, Engage earning India Ed.
11. Fundamentals of Analytical Chemistry 6 th Ed., D. A. Skoog, D.M. West, F.J. Holler, Saunders College Publishing, Fort worth (1992).
12. Instrumental Methods of Analysis. 7th Ed. Willard, H.H., Merritt, L.L., Dean, J. & Settle, F.A. Wordsworth Publishing Co. Ltd., Belmont, California, USA, 1988.
13. A Textbook of Quantiitative Inorganic Analysis 7th Ed., Vogel, A. I. Prentice Hall.
14. Analytical Chemistry 7 th edition by Gary D. Christian (2004).
15. Separation Methods, M.N Sastry, Himalaya Publication (2004).

Unit I: General Principles of Metallurgy and Production of Non Ferrous Metals   15 Hrs

S5-E-B-I: Pyrometallurgy: Drying and calcination, roasting, smelting, products of smelting.
Hydrometallurgy: Leaching methods, leaching agents, leaching of metals, oxides and sulphides.
Separation of liquid and solid phases and processing of aqueous solutions
Electrometallurgy: Electrolysis, Refining electrolysis, electrolysis from aqueous solutions, fused-salt electrolysis
Refining processes: Chemical and physical refining processes
Production of selected non-ferrous metals (Copper, Nickel, Zinc): Properties, raw materials, production (flow charts presentations and chemical reactions involved) and uses.

Unit II: Natural and Synthetic Dyes   15Hrs

S5-E-B-II: Dyes: Definition, Classification of dyes- Natural dyes, synthetic dyes; based on chemical constitution of dyes; Chemical nature of dyes; Applications of dyes.
Stuctures of natural dyes: Indigo, Tyrian purple, Alizarin, Indigotin.
Structures of Synthetic Dyes: Nitrodyes, Nitrosodyes, Azodyes (Mono azodyes, bisazodyes), diaryl methane dyes, triaryl methane dyes, Xanthene dyes, Phenolphthalein, Fluorocein, Acridine dyes.
Synthesis of dyes: Mono azodyes, bisazodyes (Congo red), Auromine O, Malachite Green, Crystal Violet, Rhodamine B, Acridine Yellow, Indigotin .
Binding of dyes to fabric. Applications of dyes.

Unit III: Catalysis I   15Hrs

S5-E-B-III: Homogeneous and heterogeneous catalysis -
Definition of a catalyst and catalysis. Comparison of homogeneous and heterogeneous catalysis with specific examples. General characteristics of catalytic reactions.
Acid-base catalysis- Examples of acid and base catalysed reactions, hydrolysis of esters.
Kinetics of acid catalysed reactions. Specific acid and general acid catalysis, Kinetics of base catalysed reactions. Specific base and general base catalysis. Examples-Aldol condensation and decomposition of nitramide, base catalysed conversion of acetone to di acetone alcohol. Mutarotation of glucose. Effect of pH on reaction rate of acid and base catalysed reactions.
Phase transfer catalysis: Principle of phase transfer catalysis, classification of phase transfer catalysts. Factors influencing the rate of PTC reactions.

Unit IV: Catalysis II   15Hrs

S5-E-B-IV: Enzyme catalysis- Characteristics of enzyme catalysis, Examples: (i) Invertase in inversion of cane sugar (ii) Maltase in conversion of maltose to glucose (iii) Urease in decomposition of urea (iv) Zymase in conversion of glucose to ethanol (v) working of carbonic anhydrase and (vi) Mechanism of oxidation of ethanol by alcohol dehydrogenase Factors affecting enzyme catalysis. Effect of temperature, pH, concentration and effect of inhibitor on enzyme catalysed reactions, Catalytic efficiency.

Kinetics of enzyme catalysed reactions: Michaelis-Menton Equation. Mechanism of enzyme catalysed reactions. Significance of Michaelis constant (Km) and maximum velocity (Vmax), Lineweaver-Burk plot. Types of enzyme inhibitors

Recommended Text Books and Reference Books

1. Industrial Chemistry, B K Sharma
2. Engineering Chemistry, Jain and Jain
3. Industrial Chemistry E. Stocchi, Vol-I, Ellis Horwood Ltd. UK.
4. Handbook of Industrial Chemistry, J. A. Kent: Riegel's, CBS Publishers, New Delhi.
5. Theory of production of non- ferrous metals and alloys Study. Kateřina Skotnicová, Monika Losertová, Miroslav Kursa
6. The Chemistry of Synthetic Dyes, Volume 4, K Venkataraman Elsevier
7. Organic Chemistry Vol-I by I.L. Finar.
8. Organic Chemistry by Jennice, Gorzinski Smith
9. Natural Dyes: Sources, Chemistry, Application and Sustainability Issues by Sujata Saxena and A. S. M. Raja.
10. Physical Chemistry by Atkins and De Paula, 8 th Edn.
11. Physical Chemistry by Puri, Sharma and Pattania, 2017.
12. Kinetics and mechanism of chemical transformations by Rajarajm and Kuraiacose, Published by Macmillan India Ltd.
13. Text book of Physical Chemistry, K.L. Kapoor, Macmillan, 1999.
14. Catalysis, J.C. Kuriacose, Macmillan Macmillan Publishers India Limited, 1980.
15. Phase Transfer Catalysis, Fundamentals, Applications and Industrial perspective, C. M. Stark, C. Liotta & M. Halpern, Academic Press
16. Phase Transfer Catalysis, E. V. Dehmlow & S. S. Dehmlow, Verlag Chemie, Weinheim

45 h (3 h / w)

1. Distribution law
a) Determination of molecular status and partition coefficient of benzoic acid in Toluene and water.
b) Determination of distribution coefficient of acetic acid between n-butanol and water.

2. Electrochemistry
a) Determination of cell constant of a conductivity cell.
b) Verification of Ostwald's dilution law- Determination of dissociation constant (K_a) of acetic acid by conductivity measurements.

3. Colorimetry
a) Verification of Beer's law using $KMnO_4$
b) Determination of the concentration of the given $KMnO_4$ solution.

4. Adsorption
b) Adsorption of acetic acid on animal charcoal - Verification of Freundlich adsorption isotherm.

5. Physical constants
a) Surface tension and   b) viscosity of liquids. (Demonstration Experiment)

Reference books:

1. Senior practical physical chemistry. B. D. Khosla, V.C. Garg, Adarsh Gulati Published by R. Chand & Co.
2. Practical Physical Chemistry: B. Vishwanathan and P.S. Raghavan. Viva Books
3. Practicals in Physical Chemistry by P.S. Sindhu ISBN-10: 1-4039-2916-5 / 1403929165 ISBN-13: 978-1-4039-2916-7 / 9781403929167

15 Hrs

Unit-I (Inorganic Chemistry)
4h
S6-O-I-1: Inorganic reaction mechanisms

Labile and inert complexes, Thermodynamic and kinetic stability based on VBT & CFT: ligand substitution reactions $-S_{N1}$ and S_{N2} in Octahedral complexes; substitution reactions of square planar complexes – Trans effect and applications of trans effect. Reactions of tetrahedral complexes - Hydrolysis of silicon halides and phosphorous oxides.

2 h
S6-O-I-2: Boranes and Carboranes

Definition of clusters. Structures of boranes and carboranes- Wade's rules, closo, nido, arachno boranes and carboranes

5 h
S6-O-I-3: Symmetry of molecules

Symmetry operations and symmetry elements in molecules. definition of axis of symmetry types of c_n, plane of symmetry (σ_h, σ_v, σ_d), center of symmetry and improper rotational axis of symmetry (S_n). Explanation with examples.

4 h
S6-O-I-4: Non – aqueous solvents

Classification and characteristics of a solvent. Reactions in liquid ammonia – physical properties, auto-ionisation, examples of ammono acids and ammono bases. Reactions in liquid ammonia – precipitation, neutralization, solvolysis, solvation - solutions of metals in ammonia, complex formation, redox reactions. Reactions in HF – autoionisation, reactions in HF – precipitation, acid – base reactions, protonation.

15 Hrs
Unit-II (Organic Chemistry)
5 h
S6-O-O-1: Pericyclic Reactions

Concerted reactions, Molecular orbitals of ethene, 1,3-butadiene and allyl radical. Symmetry properties, HOMO, LUMO, thermal and photochemical pericyclic reactions. Types of pericyclic reactions – electrocyclic, cycloaddition and sigmatropic reactions – one example each and their explanation by FMO theory.

5 h
S6-O-O-2: Synthetic Strategies

Terminology – Target molecule (TM), Disconnection approach – Retrosynthesis, Synthon, Synthetic equivalent (SE), Functional group interconversion (FGI), Linear, Convergent synthesis. Retrosynthetic analysis of the following molecules: 1) acetophenone 2) cyclohexene and 3) 2-phenylethanol.

5 h
S6-O-O-3: Asymmetric synthesis

Definition and classification of stereoslective reactions: substrate, product stereoselective reactions, enantio and diastereo selective reactions. Stereospecific reaction – definition –example – dehalogenation of 1,2-dibromides induced by iodide ion. Enantoselective reactions – definition – example –Reduction of Ethylacetoacetate by Yeast. Diastereoselective reaction- definition-

example:Acid catalysed dehydration of 1-phenylproponal and Grignard addition to 2-phenyl propanal. Definition and explanation of enantiomeric excess and diastereomeric excess.

Unit III (Physical Chemistry)   15 Hrs
S6-O-P--1: Polymers

Definition of polymers – natural polymers and synthetic polymers examples classification as plastics, fibers, elastomers.

Thermosetting, thermoplastic polymers. Branched, cross-linked and co-polymers.

Definition of polymerization-addition and condensation polymerization with examples. Explanation :chain polymerization, step polymerization, co-polymerization and co-ordination polymerization. Kinetics of free radical polymerization. Tacticity, atacticity, stereo specific synthesis- Zeigler- Natta catalyst.

Molecular weight definitions- number average, weight average molecular weight. Determination of molecular weight of polymers using viscosity method, Osmometric method. Problems.

Preparation and industrial applications of polyethylene, poly vinyl chloride (PVC), nylon –66, teflon, polyacrylonitrile and terelene.

Introduction to biodegradability and examples of biodegradable polymers.

Unit IV: (General Chemistry)   15 Hrs
S6-O-G--1:: Electroanalytical methods

Types of Electroanalytical Methods.

I) Interfacial methods – a) Potentiometry: Principle, Electrochemical cell, Electrodes- (i) Indicator and (ii) Reference electrodes – Normal Hydrogen Electrode, Quinhydrone Electrode, Saturated Calomel Electrode. Numerical Problems. Application of Potentiometry – Assay of Sulphanilamide

b) Voltametry – three electrode assembly; Intoduction to types of voltametric techniques, micro electrodes, Over potential and Polarization.

II) Bulk methods – Conductometry, Conductivity Cell, Specific Conductivity, Equivalent Conductivity. Numerical Problems. Applications of conductometry. Estimation of Cl – using AgNO$_3$. Determination of Aspirin with KOH.

Recommended Text Books and Reference books

1. Basic Inorganic Chemistry by F.A.Cotton, G.Wilkinson and Paul.L. Gaus 3 rd edn Wiley Publishers (2001).
2. Inorganic Chemistry Principles of structure and reactivity by James E.Huhey, E.A. Keiter and R.L. Keiter 4 th edn. (2006)
3. Inorganic Chemistry by Shriver and Atkins 3 rd edn Oxford Press (1999).
4. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications (1996).
5. Symmetry and Spectroscopy of Molecules, K. Veera Reddy, Second Edition, New Age International (P) Limited Publishers
6. Textbook of Inorganic Chemistry by R Gopalan, Universities Press,(2012)
7. Text book of organic chemistry by Morrison and Boyd, Pearson Publishers (2009)
8. Text book of organic chemistry by Graham Solomons, Wiley(2015)

9. Fundamentals of organic synthesis and retrosynthetic analysis by Ratna Kumar Kar, NCBA,(2014)
10. Organic synthesis by Dr. Jagadamba Singh and Dr. L.D.S. Yadav, Pragati Prakashan, 2010
11. Stereochemistry of organic compounds by D. Nasipuri, New Academic Science Limited, 2012
12. Organic chemistry by Clayden, Greeves, Warren and Wothers, Oxford University Press, 2001
13. Fundamentals of Asymmetric Synthesis by G. L. David Krupadanam, Universities Press(2014)
14. Polymer Chemistry, M G Arora and M Singh
15. Introductory Polymer Chemistry by G S Misra
16. Textbook of Polymer Science, F. W. Billmeyer Jr, John Wiley & sons
17. Polymer Science, V. R. Gowarikar, N. V. Viswanathan & J. Sreedhar, Wiley Eastern
18. Contemporary Polymer Chemistry, H. R. Alcock & F. W. Lambe, Prentice Hall
19. Materials Science and Engineering An Introduction by William D. Callister, Jr. John Wiley & Sons, Inc.
20. Principles of Instrumental Analysis, D.A. Skoog, F.J. Holler, T.A. Nieman, Engage earning India Ed.
21. Fundamentals of Analytical Chemistry 6 th Ed., D. A. Skoog, D.M. West, F.J. Holler, Saunders College Publishing, Fort worth (1992).
22. Physical Chemistry by Atkins and De Paula, 8 th Edn.
23. Physical Chemistry by Puri, Sharma and Pattania, 2017

15Hrs

Unit- I: Introduction and Terminology
S6-E-A-I: Diseases: Common diseases, infective diseases–insect borne, air-borne, water-borne and hereditary diseases.
Terminology in Medicinal Chemistry: Drug, Active Pharmaceutical Ingredient (API), Pharmaceuticals, Pharmacology, Pharmacophore, Pharmacodynamics, Pharmacokinetics, metabolites, anti metabolites and therapeutic index.
Drugs: Nomenclature: Chemical name, Generic name and Trade names with examples; Classification: Classification based on structures and therapeutic activity with examples.

ADMET: a) Absorption: Definition, absorption of drugs across the membrane – active and passive absorption, routes of administration of drugs. b) Distribution: definition and effect of plasma protein binding. c) Metabolism: definition, phase I and phase II reactions.
d) Elimination: definition and renal elimination. Toxicity.

Unit-II: Enzymes and Receptors   15Hrs
S6-E-A-II: Enzymes: Introduction. Mechanism and factors affecting enzyme action, Specificity of enzyme action (including stereo specificity), Enzyme inhibitors and their importance. Types of inhibition - reversible, irreversible and their subtypes with examples.

Receptors: Introduction, Drug action-receptor theory, Mechanism of drug action, concept of agonists and antagonists with examples. Drug receptor interactions involved in drug receptor complex. binding role of –OH group, -NH₂ group, quaternary ammonium salts and double bond. Structure – activity relationships of drug molecules, explanation with sulfonamides.

Unit- III: Synthesis and Therapeutic Activity of Drugs   15Hrs
S6-E-A-III: Introduction, synthesis and therapeutic activity of
Chemotherapeutics: Sulphanilamide, dapsone, Pencillin-G (semi synthesis), Chloroquin, Isoniazid, Cisplatin and AZT.

Drugs to treat metabolic disorders: Anti diabetic - Tolbutamide; Antiinflammatory – Ibuprofen; Cardiovascular- Glyceryl trinitrate; Antipyretic (paracetamol, aspirin) and Antacid- Omeprazole.

Drugs acting on nervous system: Anesthetics-definition, Classification-local and general. Volatile- Nitrous oxide, chloroform uses and disadvantages. Local anaesthetics – benzocaine.

Unit- IV: Molecular Messengers, Vitamins and Micronutrients   15Hrs
S6-E-A-IV: Molecular Messengers: Introduction to hormones and neurotransmitters, Thyroid hormones, Antithyroid drug-Carbimazol. Adrenaline: Adrenergic drugs- salbutamol, atenelol. Serotonin: SSRIs- fluoxetine. Dopamine: Antiparkinson drug- Levodopa .

Vitamins and Micronutrients: Introduction, vitamin sources, Deficiency disorders and remedy of Vitamins A,B, C, D, E K and micronutrients – Na, K, Ca, Cu, Zn and I .

Recommended Text Books and Reference books

1. Introduction to Medicinal Chemistry, G.L. Patrick, Oxford University Press, New York. 2013.
2. Medicinal Chemistry, Thomas Nogrady, Oxford Univ. Press, New York.2005.
3. Foye's Principles of Medicinal Chemistry, David William and Thomas Lemke, Lippincott Williams & Wilkins, 2008.
4. Medicinal Chemistry, Ashutosh Kar , New Age International, 2005.
5. Synthetic Drugs, O.D.Tyagi & M.Yadav, Anmol Publications,1998.
6. Medicinal Chemistry, Alka L. Gupta, Pragati Prakashan.
7. Drugs, G. L. David Krupadanam, D.Vijaya Prasad, K.Varaprasad Rao, K. L. N. Reddy, C. Sudhakar, Universities Press (India) Ltd. 2012.

Unit I: – Pesticides   15Hrs

S6-E-B-I: Introduction, Definition, classification of pesticides based on use (target). Toxicity and chemical structure with examples. Adverse effects of pesticides and its impact on environmental pollution.

Synthesis, manufacture and uses of representative pesticides: Organochlorines (Cypermethrin); Organophosphates (Parathion); Carbamates (Carbaryl); Quinones(Chloranil), Anilides(Alachlor).

Pesticide formulations: Dusts, Granules, Wettable powders, Emulsions and Aerosols.

Biopestcides : Introduction: Potential pesticidal plants of India, Role of Neem in plant protection-constituents, Azadirachtin and its role in pest control, Structure and mode of action of Pyrethrins(pyrethrin-1) and Pyrethroids (permethrin) and nicotinoids (Imidacloprid).

Unit II: – Fertilizers   15Hrs

S6-E-B-II: Introduction: (need of fertilizers), functions of essential plant nutrients (N, P, K), Classification formula and uses of fertilizers:

Nitrogenous fertilizers: Ammonium nitrate, Urea, Calcium Cyanamide, Calcium Ammonium Nitrate, Sodium Nitrate, Ammonium Chloride and their uses.

Phosphate fertilizers: Normal super phosphate, Triple Super Phosphate, Ammonium Phosphate and their uses.

Potassium fertilizers: Potassium chloride, potassium nitrate, potassium sulphate and uses. Complex fertilizers: Diammonium Phosphate and mixed fertilizers their uses. Manufacture of urea and Super phosphate of lime and their reactions in the soil.

Biofertilizers – Introduction, definition, classification, Rhizobium, Azatobactor, Azospirillium, Azolla, Blue Green Algae, Vermicomposting and uses.

Organic farming: The principal methods, crop rotation, green manures and compost, biological pest control, and mechanical cultivation and uses.

Unit III: Energy Sources and Coal   15Hrs.

S6-E-B-III: Review of energy sources (renewable and non-renewable). Classification of fuels and their calorific value.

Coal: Uses of coal (fuel and nonfuel) in various industries, its composition, carbonization of coal. Coal gas, producer gas and water gas—composition and uses. Fractionation of coal tar, uses of coal tar based chemicals, requisites of a good metallurgical coke, Coal gasification (Hydro gasification and Catalytic gasification), Coal liquefaction and Solvent Refining.

Unit IV: Petroleum and its products, petrochemicals and non petroleum fuels   15Hrs.
S6-E-B-IV:
Petroleum and its products

Petroleum: Origin, Composition of crude petroleum and classification. Properties- flash point and its determination, Knocking and antiknocking compounds; Octane number. and Cetane number. Distillation of crude petroleum, Fractional Distillation - Principle and process, refining, Fractions and uses. Cracking -Thermal and catalytic cracking, Reforming

Petroleum products – Petrol, Diesel, LPG, Kerosene, Tar and their applications.

Petrochemicals: Vinyl acetate, Propylene oxide, Isoprene and their uses.

Lubricants: Classification of lubricants- Solid, semisolid and liquids; Properties (viscosity, flash point, fire point, cloud point, pour point) and their determination. Functions of lubricants. Mechanism of lubrication.

Non-petroleum fuels: Natural Gas-CNG, LNG, Clean Fuels-H_2 gas, ethanol, Fuel from waste - bio-gas, Fuel from biomass –bio-ethanol, biodiesel, Synthetic fuels- syngas based.

Recommended Text Books and Reference books

1. Chemistry of pesticides, N. N. Melnikov, Springer-Verlag- Technology & Engineering (2012).
2. Pesticide Synthesis Handbook, Thomas A. Unger, Elsevier, (2000).
3. Pesticides, R. Cremlyn, John Wiley, 1980.
4. Manures and Fertilisers, K. Kolay, Published by Atlantic (2007).
5. Sharma, B.K. & Gaur, H. Industrial Chemistry, Goel Publishing House, Meerut (1996).
6. A Text Book of Engineering Chemistry Paperback – 2017 by Shashi Chawla
7. Industrial Chemistry, Vol-I, Stocchi, E, Ellis Horwood Ltd. UK (1990).
8. Jain, P.C. and Jain, M. Engineering Chemistry Dhanpat Rai & Sons, Delhi.
9. Engineering Chemistry by Shashi Chawla, Dhanpat Rai & Sons, Delhi.

Semester - VI
Laboratory course
Paper VI Experiments in Physical Chemistry-II

45h (3 h/w)

1. Kinetics
  a) Determination of specific reaction rate of the hydrolysis of methyl acetate catalyzed by hydrogen ion at room temperature.
  b) Determination of rate of decomposition of hydrogen peroxide catalyzed by $FeCl_3$.

2. Electrochemistry
A. Potentiometry:
  a) Determination of redox potential of Fe^{2+}/Fe^{3+} by potentiometric titration of ferrous ammonium sulphate vs. potassium dichromate.
  b) Precipitation titration of KCl vs. $AgNO_3$ -Determination of given concentration of silver nitrate.

B. pH metry:
  a) pH metric titration of strong acid (HCl) vs. strong base- Determination of the concentration of the given acid.
  b) pH metric titration of weak acid(acetic acid) with strong base(NaOH).- Determination of acid dissociation constant (K_a) of weak acid.

3. Conductometry:
  a) Determination of overall order: Saponification of ethyl acetate with NaOH by conductance measurements.

Reference books:

1. Senior practical physical chemistry. B. D. Khosla, V.C. Garg, Adarsh Gulati
2. Advanced Practical Physical chemistry: J.B.Yadav
3. Practical Physical Chemistry: B. Vishwanathan and P.S. Raghavan.
4. Practical in Physical Chemistry: P.S. Sindhu

Mahatma Gandhi University
Faculty of Science
B.Sc. (Computer Science)
CBCS Pattern With effect from the Academic Year 2019-2020

Code	Course Title	Course Type	HpW	Credits
	Semester -I			
BS1O6	Programming in C	DSC-3A	4T + 3P = 7	4 + 1 = 5
	Semester -II			
BS206	Programming in C++	DSC-3B	4T + 3P = 7	4 + 1 = 5
	AECC			
BS107	Fundamentals of Computers	AECC	2T	2
	Semester -III			
BS301	Python –1	SEC-1	2T	2
BS302	Operating System –1	SEC-2	2T	2
BS306	Data Structure using C++	DSC-3C	4T + 3P = 7	4 + 1 = 5
	Semester -IV			
BS401	Python –2	SEC-3	2T	2
BS402	Operating System–2	SEC-4	2T	2
BS406	Data Base Management Systems (DBMS)	DSC-3D	4T + 3P = 7	4 + 1 = 5
	Semester -V			
BS501	Information Technologies	GE	4T	4
BS502	Programming in Java	DSE-3E	4T + 3P = 7	4 + 1 = 5
	Semester -VI			
BS605	Web Technologies	DSE-3F	4T + 3P = 7	4 + 1 = 5
	Project/Optional			
BS606	PHP with MySQL	P/O	3T + 3P = 3	3 + 1 = 4
			Total Number of Credits	48

B.Sc. (Computer Science)
Semester -I

DSC–3A   Programming in C   BS106

Theory	4 Hours/Week	4credits
Practical	3 Hours/Week	1credit

Unit – I

Computer Fundamentals: Introduction of Computers, Classification of Computers, Anatomy of a Computer, Memory Hierarchy, Introduction to OS, Operational Overview of a CPU.

Program Fundamentals: Generation and Classification of Programming Languages, Compiling, Interpreting, Loading, Linking of a Program, Developing Program, Software Development.

Algorithms: Definitions, Different Ways of Stating Algorithms (Step-form, Pseudo-code, Flowchart), Strategy for Designing Algorithms, Structured Programming Concept.

Basics of C: Overview of C, Developing Programs in C, Parts of Simple C Program, Structure of a C Program, Comments, Program Statements, C Tokens, Keywords, Identifiers, Data Types, Variables, Constants, Operators and Expressions, Expression Evaluation–precedence and associativity, Type Conversions.

Unit – II

Input-Output: Non-formatted and Formatted Input and Output Functions, Escape Sequences,

Control Statements: Selection Statements – if, if-else, nested if, nested if-else, comma operator, conditional operator, switch; Iterative Statements–while, for, do-while; Special Control Statement–goto, break, continue, return, exit.

Arrays and Strings: One-dimensional Arrays, Character Arrays, Functions from ctype.h, string.h, Multidimensional Arrays.

Unit – III

Functions: Concept of Function, Using Functions, Call-by-Value Vs Call-by-reference, Passing Arrays to Functions, Score of Variables, Storage Classes, Inline Functions, and Recursion.

Pointers: Introduction, Address of Operator (&), Pointer, Uses of Pointers, Arrays and Pointers, Pointers and Strings, Pointers to Pointers, Array of Pointers, Pointer to Array, Dynamic Memory Allocation.

Unit – IV

User-defined Data Types: Declaring a Structure (Union) and its members, Initialization Structure (Union), Accessing members of a Structure (Union), Array of Structures (Union), Structures verses Unions, Enumeration Types.

Files: Introduction, Using Files in C, Working with Text Files, Working with Binary Files, Files of Records, Random Access to Files of Records, Other File Management Functions.

Text Book   PradipDey, ManasGhosh, *Computer Fundamentals and Programming in C*(2e)
Reference s   Ivor Horton, *Beginning C*
                 Ashok Kamthane, *Programming in C*
                 Herbert Schildt, *The Complete Reference C*
                 Paul Deitel, Harvey Deitel, *C How To Program*
                 Byron S. Gottfried, *Theory and Problems of Programming*
                 *with C*Brian W. Kernighan, Dennis M. Ritchie, *The C*
                 Programming Language
                 B. A. Forouzan, R. F. Gilberg, *A Structured Programming Approach Using C*

B.Sc. (Computer Science)
Semester -I

Programming in C Lab   BS106

Practical   3 Hours/Week   1credit

1   Write a program to find the largest two (three) numbers using if and conditional operator.
2   Write a program to print the reverse of a given number.

3   Write a program to print the prime number from 2 to n where n is given by user.
4   Write a program to find the roots of a quadratic equation using switch statement.

5   Write a program to print a triangle of stars as follows (take number of lines from user):

```
        *
      * * *
      *****
     *******
    *********
```

6   Write a program to find largest and smallest elements in a given list of numbers.
7   Write a program to find the product of two matrices..

8   Write a program to find the GCD of two numbers using iteration and recursion.

9   Write a program to illustrate use of storage classes.

10   Write a program to demonstrate the call by value and the call by reference concepts.

11   Write a program that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.

12   Write a program to illustrate use of data type enum.
13   Write a program to demonstrate use of string functions string.h headerfile.

14   Write a program that opens a file and counts the number of characters in a file.

15   Write a program to create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.

16   Write a program that opens an existing text file and copies it to a new text file with all lowercase letters changed to capital letters and all other characters unchanged.

Note : Write the Pseudo Code and draw Flow Chart for the above programs.
        Recommended to use Open Source Software : GCC on Linux; Dev C++ (or) CodeBlocks on Windows 10.

B.Sc. (Computer Science)
Semester -II

DSC–3B   **Programming in C++**   BS206

Theory	4 Hours/Week	4credits
Practical	3 Hours/Week	1credit

Unit – I

Introduction to C++: Applications, Example Programs, Tokens, Data Types, Operators, Expressions, Control Structures, Arrays, Strings, Pointers, Searching and Sorting Arrays.

Functions: Introduction, Prototype, Passing Data by Value, Reference Variables, Using Reference Variables as Parameters, Inline Functions, Default Arguments, Overloading Functions, Passing Arrays to Functions. Object Oriented Programming: Procedural and Object-Oriented Programming, Terminology, Benefits, OOP Languages, and OOP Applications.

Unit – II

Classes: Introduction, Defining an Instance of a Class, Why Have Private Members? Separating Class Specification from Implementation, Inline Member Functions, Constructors, Passing Arguments to Constructors, Destructors, Overloading Constructors, Private Member Functions, Arrays of Objects, Instance and Static Members, Friends of Classes, Member-wise Assignment, Copy Constructors, Operator Overloading, Object Conversion, Aggregation.

Unit – III

Inheritance: Introduction, Protected Members and Class Access, Base Class Access Specification, Constructors and Destructors in Base and Derived Classes, Redefining Base Class Functions, Class Hierarchies, Polymorphism and Virtual Member Functions, Abstract Base Classes and Pure Virtual Functions, Multiple Inheritance.
C++ Streams: Stream Classes, Unformatted I/O Operations, Formatted I/O Operations.

Unit – IV

Exceptions: Introduction, Throwing an Exception, Handling an Exception, Object-Oriented Exception Handling with Classes, Multiple Exceptions, Extracting Data from the Exception Class, Re-throwing an Exception, Handling the bad_alloc Exception.

Templates: Function Templates–Introduction, Function Templates with Multiple Type, Overloading with Function Templates, Class Templates – Introduction, Defining Objects of the Class Template, Class Templates and Inheritance, Introduction to the STL.

Text   Tony Gaddis, *Starting out with C++: from control structures through objects*(7e)
Refere B. Lippman, *C++ Primer*
nce s   Bruce Eckel, *Thinking in C++*
        K.R. Venugopal, *Mastering C++*
        Herbert Schildt,*C++: The Complete Reference*
        BjarneStroustrup, *The C++ Programming Language*
        SouravSahay,*Object Oriented Programming with C++*

B.Sc. (Computer Science)
Semester -II

Programming in C++ Lab   BS206

Practical   3 Hours/Week   1credit

1. Write a program to.
   a.   Print the sum of digits of a givennumber.
   b.   Check whether the given number is Armstrong ornot
   c.   Print the prime number from 2 to n where n is natural numbergiven
2. Write a program to find largest and smallest elements in a given list of numbers and sort the given list.
3. Write a program to read the student name, roll no, marks and display the same using class and object.
4. Write a program to implement the dynamic memory allocation and de-allocation using new and delete operators using class and object.
5. Write a program to find area of a rectangle, circle, and square using constructors.
6. Write a program to implement copy constructor.
7. Write a program using friend functions and friend class.
8. Write a program to implement constructors
   · Default Constructor, Parameterized Constructor, Copy Constructor
   · Define the constructor inside/outside of the class
   · Implement all three constructors within a single class as well as use multiple classes (individual classes)
9. Write a program to implement the following concepts using class andobject ·
   Function overloading
   · Operator overloading (unary/binary(+ and-))
10. Write a program to demonstrate single inheritance, multilevel inheritance and multipleinheritances.

11. Write a program to implement the overloaded constructors ininheritance.

12. Write a program to implement the polymorphism and the following concepts using class andobject. ·Virtual functions
    · Pure virtualfunctions
13. Write a program to implement the virtual concepts for followingconcepts · Constructor (notapplied)
    · Destructor (applied)

14. Write a program to demonstrate static polymorphism using methodoverloading.

15. Write a program to demonstrate dynamic polymorphism using method overriding and dynamic method dispatch.

16. Write a program to implement the template (generic)concepts
    · Without template class andobject
    · With template class andobject
17.   Write the Pseudo Code and draw Flow Chart for the above programs.

Note:
Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows.

B.Sc. (Computer Science)
Semester -II

AECC   **Fundamentals of Computers**   BS107

Theory   2Hours/Week   2 credits

Unit-I

Introduction to Computers: what is a computer, characteristics of Computers, Generations of Computers, Classifications of Computers, Basic Computer organization, Applications of Computers. Input and Output Devices: Input devices, Output devices, Softcopy devices, Hard copy devices. Computer Memory and Processors: Introduction, Memory Hierarchy, Processor, Registers, Cache memory, primary memory, secondary storage devices, magnetic tapes, floppy disks, hard disks, optical drives, USB flash drivers, Memory cards, Mass storage devices, Basic processors architecture.

Unit – II

Number System and Computer Codes: Binary number system, working with binary numbers, octal number system, hexadecimal number system, working with fractions, signed number representation in binary form, BCD code, other codes. Boolean algebra and logic gates: Boolean algebra, Venn diagrams, representation of Boolean functions, logic gates, logic diagrams and Boolean expressions using karnaugh-map. Computer Software: Introduction to computer software, classification of computer software, system software, application software, firmware, middleware, acquiring computer software, design and implementation of correct, efficient and maintainable programs.

Text Book:
ReemaThareja, Fundamentals of Computers.

References:
1. V. Rajaraman, 6th Edition Fundamentals of Computers, Neeharika Adabala.
2. Anita Goel, Computer Fundamentals.

B.Sc. (Computer Science)
Semester -III

Sec-1   Python-1   BS301

Theory   2Hours/Week   2 credits

Unit – I

Introduction to Python Programming: How a Program Works, Using Python, Program Development Cycle, Input, Processing, and Output, Displaying Output with the Print Function, Comments, Variables, Reading Input from the Keyboard, Performing Calculations (Operators. Type conversions, Expressions), More about Data Output.

Decision Structures and Boolean Logic: if, if-else, if-elif-else Statements, Nested Decision Structures, Comparing Strings, Logical Operators, Boolean Variables.

Repetition Structures: Introduction, while loop, for loop, Calculating a Running Total, Input Validation Loops, Nested Loops.

Unit – II

Functions: Introduction, Defining and Calling a Void Function, Designing a Program to Use Functions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants, Value-Returning Functions- Generating Random Numbers, Writing Our Own Value-Returning Functions, The math Module, Storing Functions in Modules.

File and Exceptions: Introduction to File Input and Output, Using Loops to Process Files, Processing Records, Exceptions.

Text Books Tony Gaddis, *Starting Out With Python(3e)*

References
1. Kenneth A. Lambert, *Fundamentals of Python*
2. Clinton W. Brownley, *Foundations for Analytics with Python*
3. JamesPayne,*BeginningPythonusingPython2.6andPython3*
4. Charles Dierach, *Introduction to Computer Science using Python*
5. PaulGries,*PracticalProgramming:AnIntroductiontoComputerScienceusingPython3*

B.Sc. (Computer Science)
Semester -III

SEC–2[B]   OperatingSystems-1   BS302

Theory   2Hours/Week   2 credits

Unit – I

Introduction: Computer-System Architecture, Computing Environments. Operating-System Structures: Operating-System Services, User Interface for Operating-System, System Calls, Types of System Calls, Operating System Structure.

Process Management: Process Concept, Process Scheduling, Operations on Processes, Inter process Communication, Examples–Producer-Consumer Problem.
Process Synchronization: Critical-Section Problem, Peterson's Solution, Synchronization, Semaphores, Monitors.

Unit – II

CPU Scheduling: Concepts, Scheduling Criteria, Scheduling Algorithms.

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Text   AbrahamSilberschatz,PeterBaerGalvin,GregGagne,*OperatingSystemConcepts(9e)*

Reference s   NareshChauhan, *Principles of Operating Systems* Thomas W. Doeppner, *Operating Systems in Depth* Andrew S. Tanenbaum, *Modern Operating Systems*

William Stallings, *Operating Systems – Internals and Design Principles* Dhananjay M. Dhandhere, *Operating Systems – A Concept Based Approach*

B.Sc. (Computer Science)
Semester -III

DSC–3C   Data Structures Using C++   BS306

Theory	4 Hours/Week	4credits
Practical	3 Hours/Week	1credit

Unit – I

Fundamental Concepts: Introduction to Data Structures, Types of Data Structures, Introduction to Algorithm, Pseudo-code, Flow Chart, Analysis of Algorithms.

Linear Data Structure Using Arrays: 1-D Arrays, 2-D Arrays, N-D Arrays, Memory Representation and Address Calculation of 1-D, 2-D, N-D Arrays, Concept of Ordered List, String Manipulation, Pros and Cons of Arrays.

Stacks: Concept, Primitive Operations, Abstract Data Type, Representation Stacks Using Arrays, Prefix, Infix, Postfix Notations for Arithmetic Expression, Applications of Stacks– Converting Infix Expression to Postfix Expression, Evaluating the Postfix Expression, Checking Well-formed (Nested) Parenthesis, Processing of Function Calls, Reversing a String.

Unit – II

Recursion: Introduction, Recurrence, Use of Stack in Recursion, Variants of Recursion, Execution of Recursive Calls, Recursive Functions, Iteration versus Recursion.

Queues: Concept, Primitive Operations, Abstract Data Type, Representation Queues Using Arrays, Circular Queue, Double-Ended Queue, Applications of Queues.

Linked Lists: Introduction, Concept, Terminology, Primitive Operations-creating, inserting, deleting, traversing, Representation of Linked Lists, Linked List Abstract Data Type, Linked List Variants - Singly Linked List, Doubly Linked List, Linear and Circular Linked List, Representation Stacks and Queues Using Linked Singly Lists, Application of Linked List–Garbage Collection.

Unit – III

Trees: Introduction, Representation of a General Tree, Binary Tree Introduction, Binary Tree Abstract Data Type, Implementation of Binary Trees, Binary Tree Traversals – Preorder, Inorder, Postorder Traversals, Applications of Binary Trees Briefly.

Graphs: Introduction, Graph Abstract Data Type, Representation of Graphs, Graph Traversal – Depth-First Search, Breadth-First Search, Spanning Tree – Prim's Algorithm, Kruskal's Algorithm. Hashing: Introduction, Hash Functions, Collision Resolution Strategies.

Unit – IV

Searching and Sorting: Sequential (Linear) Search, Binary Search, Bubble Sort, Insertion Sort, Selection Sort, Quick Sort, Merge Sort, and Comparison of Sorting Techniques. Heaps: Concept, Implementation, Abstract Data Type, Heap Sort.

Text Book   Varsha H. Patil, *Data Structures Using C++*

References   Nell Dale, *C++ Plus Data Structures*
SeymorLipschutz, *Data Structures (Revised 1e)*
Adam Drozdek, *Data Structures and Algorithms in C++*
Mark Allen Weiss, *Data structures and Algorithm Analysis in C++ (4e)*

D.S. Malik, *C++ Programming: Program Design Including Data Structures (6e)* Michael Main, Walter Savitch, *Data Structures and Other Objects Using C++ (4e)* Michael T. Goodrich, R. Tamassia, David M. Mount, *Data Structures and Algorithms in C++* Yonghui Wu, Jiande Wang, *Data Structure Practice for Collegiate Programming Contests and Education*

B.Sc. (Computer Science)
Semester -III

Data Structures Lab   BS306

Practical   3 Hours/Week   1credit

1   Write programs to implement the following using an array: a) Stack ADT b) Queue ADT.
2   Write a program to convert the given infix expression to postfix expression using stack.
3   Write a program to evaluate a postfix expression using stack.
4   Write a program to ensure the parentheses are nested correctly in an arithmetic expression.
5   Write a program to find following using Recursion
     a) Factorial of +ve Integer b) n^{th} term of the Fibonacci Sequence c) GCD of two +ve integers
6   Write a program to create a single linked list and write functions to implement the following operations.
     a) Insert an element at a specified position
     b) Delete a specified element in the list
     c) Search for an element and find its position in the list
     d) Sort the elements in the list ascending order

7   Write a program to create a double linked list and write functions to implement the following operations.
     a)   Insert an element at a specified position
     b) Delete a specified element in the list
     c) Search for an element and find its position in the list
     d) Sort the elements in the list ascending order

8   Write a program to create singular circular linked lists and function to implement the following operations.
     a) Insert an element at a specified position
     b) Delete a specified element in the list
     c) Search for an element and find its position in the list
9   Write programs to implement the following using a single linked list:
     a) Stack ADT b) Queue ADT.

10 Write a program to implement Binary search technique using Iterative method and Recursive methods.
11 Write a program for sorting the given list numbers in ascending order using the following technique: Bubble sort and Selection sort
12 Write a program for sorting the given list numbers in ascending order using the following technique: Insertion sort and Quicksort
13 Write a program for sorting the given list numbers in ascending order using the following technique: Merge sort and Heapsort
14 Write a program to traverse a binary tree in following way.
     a) Pre-order   b)In-order   c)Post-order
15 Write a program to the implementation graph traversals – BFS and DFS.
16 Write a program to find the minimum spanning tree for a weighted graph using
     a) Prim'sAlgorithm   b) Kruskal's Algorithm.
17   Write the Pseudo Code for the above programs.

Note: Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows.

B.Sc. (Computer Science)
Semester -IV

SEC-3   Python-2   BS401

Theory   2Hours/Week   2 credits

Unit – I

Lists and Tuples: Sequences, Introduction to Lists, List slicing, Finding Items in Lists with the in Operator, List Methods and Useful Built-in Functions, Copying Lists, Processing Lists, Two-Dimensional Lists, Tuples. Strings: Basic String Operations, String Slicing, Testing, Searching, and Manipulating Strings.
Dictionaries and Sets: Dictionaries, Sets, Serializing Objects.
Recursion: Introduction, Problem Solving with Recursion, Examples of Recursive Algorithms.

Unit – II

Object-Oriented Programming: Procedural and Object-Oriented Programming, Classes, Working with Instances, Techniques for Designing Classes, Inheritance, Polymorphism.

GUI Programming: Graphical User Interfaces, Using the tkinter Module, Display text with Label Widgets, Organizing Widgets with Frames, Button Widgets and Info Dialog Boxes, Getting Input with Entry Widget, Using Labels as Output Fields, Radio Buttons, Check Buttons.

Text Book   Tony Gaddis, *Starting Out With Python(3e)*

References
1. Kenneth A. Lambert, *Fundamentals of Python*
2. Clinton W. Brownley, *Foundations for Analytics with Python*
3. JamesPayne,*BeginningPythonusingPython2.6andPython3*
4. Charles Dierach, *Introduction to Computer Science using Python*
5. PaulGries,*PracticalProgramming:AnIntroductiontoComputerScienceusingPython3*

B.Sc. (Computer Science)
Semester -IV

SEC–4   Operating Systems-2   BS402

Theory   **2**Hours/Week   2credits

Unit – I
Main Memory: Introduction, Swapping, Contiguous Memory Allocation, Segmentation, Paging.
Virtual Memory: Introduction, Demand Paging, Page Replacement, Allocation of Frames, Thrashing.
Mass-Storage Structure: Overview, Disk Scheduling, RAID Structure.
File Systems: File Concept, Access Methods, Directory and Disk Structure, File-System Mounting, Protection.

Unit – II
File System Implementation, Directory Implementation, Allocation Methods, Free-Space Management.
Recovery, Network File System.
Protection and Security: Goals of Protection, Principles of Protection, Domain of Protection,

Access Matrix, Access Control, Revocation of Access Rights, The Security Problem, Program Threats, System and Network Threats, Cryptography as a Security Tool, User Authentication, Implementing Security Defenses, Firewalling to Protect Systems and Networks, Computer-Security Classifications. Case Study: Windows 7 and Linux System.

Text   AbrahamSilberschatz,PeterBaerGalvin,GregGagne,*OperatingSystemConcepts(9e)*

Reference s   Naresh Chauhan, *Principles of Operating Systems*

Thomas W. Doeppner, *Operating Systems in Depth*

Andrew S. Tanenbaum, *Modern Operating Systems*

William Stallings, *Operating Systems – Internals and Design Principles*

Dhananjay M. Dhandhere, *Operating Systems – A Concept Based Approach*

B.Sc. (Computer Science)
Semester -IV

DSC–3D   Database Management Systems   BS406

Theory	4 Hours/Week	4 credits
Practical	3 Hours/Week	1 credit

Unit – I

Introduction to Databases: Introduction, Traditional File-Based Systems, Database Approach, Roles in the Database Environment, Advantages and Disadvantages of DBMSs, The Three-Level ANSI-SPARC Architecture, Database Languages, Data Models, Functions of a DBMS, Components of a DBMS. Relational Model: Introduction, Terminology, Integrity Constraints, Views.

The Relational Algebra: Unary Operations, Set Operations, Join Operations, Division Operation, Aggregation and Grouping Operations.

Unit – II

SQL: Introduction, Data Manipulation–Simple Queries, Sorting Results, Using the SQL Aggregate Functions, Grouping Results, Sub-queries, ANY and ALL, Multi-table Queries, EXISTS and NOT EXIST, Combining Result Tables, Database Updates.

SQL: The ISO SQL Data Types, Integrity Enhancement Feature–Domain Constraints, Entity Integrity, Referential Integrity, General Constraints, Data Definition–Creating a Database, Creating a Table, Changing a Table Definition, Removing a Table, Creating an Index, Removing an Index, Views–Creating a View, Removing a View, View Resolution, Restrictions on Views, View Updatability, WITH CHECK OPTION, Advantages and Disadvantages of Views, View Materialization, Transactions, Discretionary Access Control–Granting Privileges to Other Users, Revoking Privileges fromUsers.

Advanced SQL: The SQL Programming Language–Declarations, Assignments, Control Statements, Exceptions, Cursors, Subprograms, Stored Procedures, Functions, and Packages, Triggers, Recursion.

Unit – III

Entity–Relationship Modeling: Entity Types, Relationship Types, Attributes, Keys, Strong and Weak Entity Types, Attributes on Relationships, Structural Constraints, Problems with ER Models–Fan Traps, Chasm Traps.

Enhanced Entity–Relationship Modeling: Specialization/Generalization, Aggregation, Composition. Functional–Dependencies: Anomalies, Partial Functional Dependency, Transitive Functional Dependency, Multi Valued Dependency, Join Dependency.

Normalization: The Purpose of Normalization, How Normalization Supports Database Design, Data Redundancy and Update Anomalies, Functional Dependencies in brief, The Process of Normalization,1NF, 2NF, 3NF, BCNF. The Database Design Methodology for Relational Databases(Appendix–D).

Unit – IV

Transaction Management: Transaction Support–Properties of Transactions, Database Architecture, Concurrency Control–The Need for Concurrency Control, Serializability and Recoverability, Locking Methods, Deadlock, Time Stamping Methods, Multi-version Timestamp Ordering, Optimistic Techniques, Granularity of Data Items, Database Recovery–The Need for Recovery, Transactions and Recovery, Recovery Facilities, Recovery Techniques, Nested Transaction Model.

Security: Database Security–Threats, Computer-Based Controls–Authorization, Access Controls, Views, Backup and Recovery, Integrity, Encryption, RAID.

Text Book   Thomas M. Connolly, Carolyn E. Begg, *Database Systems–A Practical Approach to Design, Implementation, and Management (6e)*

References   Sharon Allen, Evan Terry, *Beginning Relational Data Modeling*
Jeffrey A. Hoffer, V. Ramesh, HeikkiTopi, *Modern Database Management*
Raghu Ramakrishnan, Johannes Gehrke, *Database Management Systems*
RamezElmasri, Shamkant B. Navathe, *Fundamentals of Database Systems*
Abraham Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts*
C Coronel, S Morris, Peter Rob, *Database Systems: Design, Implementation, and Management*

B.Sc. (Computer Science)
Semester -IV

Database Management Systems Lab   BS406

Practical   3 Hours/Week   1 credit

Consider the relational schema for part of the **Dream Home** case study is:
   Branch (branchNo, street, city, postcode)
   Staff (staffNo, fName, IName, position, sex, DOB, salary, branchNo)
   Property For Rent (propertyNo, street, city, postcode, type, rooms, rent, ownerNo, staffNo, branchNo)
   Client (clientNo, fName, IName, telNo, prefType, maxRent, eMail)
   Private Owner (ownerNo, fName, IName, address, telNo, eMail, password)
   Viewing (clientNo, propertyNo, viewDate, comment)
   Registration (clientNo, branchNo, staffNo, dateJoined)

1. Create a database with name "DreamHome" and now create all the tables listed above with constraints.
2. Insert a new row into the table supplying data for all columns.
3. Modify data in the database using UPDATE
4. Delete data from the database using DELETE
5. Changing a table definition using ALTER
6. Removing a table using DROP
7. Removing rows in table using TRUNCATE
8. Create an index and removing an index
9. Practice other standard SQL commands for creating, modifying, displaying data oftables.
10. List full details of all staff.
11. List all staff with a salary greater than£10000.
12. List the property numbers of all properties that have been viewed.
13. Produce a list of salaries for all staff, showing only the staffNo, fName, IName, and salarydetails.
14. List all cities where there is either a branch office or a property for rent.
15. List all cities where there is a branch office but no properties for rent.
16. List all cities where there is both a branch office and at least one property for rent.
17. List the names and comments of all clients who have viewed a property for rent.
18. Produce a status report on property viewings.
19. List complete details of all staff who work at the branch in Glasgow.
20. List the addresses of all branch offices in London or Glasgow
21. List all staff with a salary between £20,000 and£30,000.
22. Identify all clients who have viewed all properties with three rooms.
23. How many properties cost more than £350 per month to rent?
24. How many different properties were viewed in May2013?
25. Find the total number of Managers and the sum of their salaries.
26. Find the minimum, maximum, and average staff salary.
27. Find the number of staff working in each branch and the sum of their salaries.
28. List all managers and supervisors.
29. Find all owners with the string 'Glasgow' in their address.
30. List the details of all viewings on property PG4 where a comment has not been supplied.
31. Produce a list of salaries for all staff, arranged in descending order of salary.
32. Produce an abbreviated list of properties arranged in order of property type.
33. Find the number of staff working in each branch and the sum of their salaries.
34. For each branch office with more than one member of staff, find the number of staff working in each branch and the sum of their salaries.
35. List the staff who work in the branch at '163 MainSt'.
36. List all staff whose salary is greater than the average salary, and show by how much their salary is greater than the average.
37. List the properties that are handled by staff who work in the branch at '163 MainSt'.
38. Find all staff whose salary is larger than the salary of at least one member of staff at branchB003.
39. Find all staff whose salary is larger than the salary of every member of staff at branchB003
40. List the names of all clients who have viewed a property, along with any comments supplied.
41. For each branch office, list the staff numbers and names of staff who manage properties and the properties that they manage.
42. For each branch, list the staff numbers and names of staff who manage properties, including the city in which the branch is located and the properties that the staff manage.

43. Find the number of properties handled by each staff member, along with the branch number of the member of staff.
44. List all branch offices and any properties that are in the same city.
45. List all properties and any branch offices that are in the same city.
46. List the branch offices and properties that are in the same city along with any unmatched branches or properties.
47. Find all staff who work in a London branch office.
48. Construct a list of all cities where there is either a branch office or a property.
49. Construct a list of all cities where there is both a branch office and a property.
50. Create a view so that the manager at branch B003 can see the details only for staff who work in his or her branch office.
51. Create a view of the staff details at branch B003 that excludes salary information, so that only managers can access the salary details for staff who work at their branch.
52. Create a view of staff who manage properties for rent, which includes the branch number they work at, their staff number, and the number of properties they manage.
53. Removing a view using DROPVIEW
54. Give the user with authorization identifier Manager all privileges on the Staff table.
55. Give users Personnel and Director the privileges SELECT and UPDATE on column salary of the Staff table.
56. Revoke the privilege SELECT on the Branch table from all users.
57. Revoke all privileges you have given to Director on the Staff table.
58. Demonstrate exceptions in PL/SQL
59. Demonstrate cursors in PL/SQL
60. Write PL/SQL queries to create procedures.
61. Write PL/SQL queries to create functions.
62. Write PL/SQL queries to create package.
63. Write PL/SQL queries to create triggers.
64. Write PL/SQL queries using recursion.
65. Create a database with name "Hotel" and now create all the tables listed above with constraints.
66. Insert a new row into the table supplying data for all columns.
67. Modify data in the database using UPDATE
68. Delete data from the database using DELETE
69. Changing a table definition using ALTER
70. Removing a table using DROP
71. Removing rows in table using TRUNCATE
72. Practice other standard SQL commands for creating, modifying, displaying data of tables.
73. List full details of all hotels.
74. List full details of all hotels in London.
75. List the names and addresses of all guests living in London, alphabetically ordered by name.
76. List all double or family rooms with a price below £40.00 per night, in ascending order of price.
77. List the bookings for which no dateTo has been specified.
78. How many hotels are there?
79. What is the average price of a room?
80. What is the total revenue per night from all double rooms?
81. How many different guests have made bookings for August?
82. List the price and type of all rooms at the Grosvenor Hotel.
83. List all guests currently staying at the Grosvenor Hotel.
84. List the details of all rooms at the Grosvenor Hotel, including the name of the guest staying in the room.
85. What is the total income from bookings for the Grosvenor Hotel today?
86. List the rooms that are currently unoccupied at the Grosvenor Hotel.
87. What is the lost income from unoccupied rooms at the Grosvenor Hotel?
88. List the number of rooms in each hotel.
89. List the number of rooms in each hotel in London.
90. What is the average number of bookings for each hotel in August?
91. What is the most commonly booked room type for each hotel in London?
92. What is the lost income from unoccupied rooms at each hotel today?
93. Insert rows into each of these tables.

94. Update the price of all rooms by5%.
95. Demonstrate that queries written using the UNION operator and same can be rewritten using the OR.
96. Apply the syntax for inserting data into a table.
97. Create a view containing the cheapest hotels in the world.
98. Create the Hotel table using the integrity enhancement features of SQL.
99. Create a database trigger for the following situations:
    (a) The price of all double rooms must be greater than£100.
    (b) The price of double rooms must be greater than the price of the highest single room.
    (c) A booking cannot be for a hotel room that is already booked for any of the specified dates.
    (d) A guest cannot make two bookings with overlapping dates.
    (e) Maintain an audit table with the names and addresses of all guests who make bookings for hotels in London (do not store duplicate guest details).

100. Find the names and ages of all sailors.
101. Find all sailors with a rating above7.
102. Find the names of sailors who have reserved boat103.
103. Find the sids of sailors who have reserved a red boat.
104. Find the names of sailors who have reserved a red boat.
105. Find the colors of boats reserved by Lubber.
106. Find the names of sailors who have reserved at least one boat.
107. Find the names of sailors who have reserved at least two boats.
108. Compute increments for the ratings of persons who have sailed two different boats on the same day.
109. Find the ages of sailors whose name begins and ends with B and has at least threecharacters.
110. Find the names of sailors who have reserved a red or a green boat.
111. Find the names of sailors who have reserved a red and a green boat.
112. Find the sids of all sailors who have reserved red boats but not green boats.
113. Find all sids of sailors who have a rating of 10 or have reserved boat104.
114. Find the names of sailors who have not reserved a red boat.
115. Find sailors whose rating is better than some sailor called Horatio.
116. Find sailors whose rating is better than every sailor called Horatio.
117. Find the names of sailors who have reserved all boats.
118. Find the names of sailors who have reserved at least two boats.
119. Find the names of sailors who have reserved all boats called Interlake.
120. Find sailors who have reserved all red boats.
121. Find the sailor name, boat id, and reservation date for each reservation.
122. Find the sids of sailors with age over 20 who have not reserved a red boat.
123. Find the average age of all sailors.
124. Find the average age of sailors with a rating of10.
125. Find the name and age of the oldest sailor.
126. Count the number of different sailor names.
127. Find the names of sailors who are older than the oldest sailor with a rating of10.
128. Find the sailors with the highest rating.
129. Find the age of the youngest sailor for each rating level.
130. Find age of the youngest sailor who is eligible to vote for each rating level with at least 2 such sailors.
131. Find the average age of sailors for each rating level that has at least two sailors.
132. For each red boat, find the number of reservations for this boat.
133. Find the average age of sailors who are of voting age (i.e., at least 18 years old) for each rating level that has at least two sailors.
134. Delete the records of sailors who have rating 8 (deleting some rows in a table).
135. Loading data which is present in the text into the table.

Note : Recommended to use open source database software like MySQl, MongoDB, PostgreSQL, etc…

In practical examination, students have to
- Create database
- Create tables with their integrity constraints.
- Insert the data into tables and then execute the queries.
- Answer any **six** queries from **ten** queries given by the examiner.

B.Sc. (Computer Science)
Semester -V

GE   Information Technologies   BS501

Theory   4Hours/Week   4 credits

Unit – I

Information Technology Basics – introduction, Need for Information Storage and Processing, Information Technology Components , Role of information Technology, Information Technology and the Internet .
Emerging Trends in IT - Introduction , Electronic Commerce (E-Commerce), Electronic Data Interchange(EDI),
Smart Cards , Mobile Communication, Internet Protocol TV.

Unit – II

Computer Software: Introduction, Classification of Computer Software, System Software, Applications Software, Firmware, Middleware, Acquiring Computer Software.

Operating Systems: Introduction, Evolution of OS, Process Management, Memory Management, File Management, Device Management, Security Management, Command Interpreter, Windows, Linux.

Unit – III

Introduction to Algorithms and Programming Languages: Algorithm, Control Structures, Flowcharts, Pseudo code, Programming Languages, Generations of Programming Languages.
Database Systems: File Oriented Approach, Database Oriented Approach, Database Views, Three-Schema Architecture, Database Models, Components of DBMS, Introduction of SQL Queries.

Unit – IV

Computer Networks: Introduction, Connection Media, Data Transmission Mode, Data Multiplexing, Data Switching, Network Topologies, Types of Networks, Networking Devices, OSI Model. The Internet: Internet Services, Types of Internet Connections, Internet Security.

Emerging Computer Technologies: Distributed Networking, Peer-to-peer Computing, Grid Computing, Cloud Computing, Utility Computing, On0demand Computing, Wireless Network, Bluetooth, Artificial Intelligence.

Text   Wiley India Editorial Team,Fundamentals of Information Technology

              ReemaThareja, *Fundamentals ofComputers*

Reference s   P. K. sinha, *ComputerFundamentals*
              Anita Goel, *ComputerFundamentals*
              V. Rajaraman, *Fundamentals of Computers*
              E. Balagurusamy, *Fundamentals of Computers*
              J. Glenn Brookshear, Dennis Brylow, *Computer Science An Overview*

B.Sc. (Computer Science)
Semester -V

DSC–3E   **Programming in Java**   BS505

Theory	4Hours/Week	4credits
Practical	3 Hours/Week	1credit

Unit – I

Introduction: Java Essentials, JVM, Java Features, Creation and Execution of Programs, Data Types, Type Conversion, Casting, Conditional Statements, Loops, Branching Mechanism, Classes, Objects, Class Declaration, Creating Objects, Method Declaration and Invocation, Method Overloading, Constructors– Parameterized Constructors, Constructor Overloading, Cleaning-up unused Objects, Class Variables & Methods-static Keyword, this Keyword.

Unit – II

One-Dimensional Arrays, Two-Dimensional Arrays, Command-Line Arguments, Inner Class.

Inheritance: Introduction, Types of Inheritance, extends Keyword, Examples, Method Overriding, super, final Keywords, Abstract classes, Interfaces, Abstract Classes Verses Interfaces. Packages– Creating and Using Packages, Access Protection, Wrapper Classes, String Class, StringBuffer Class. Exception: Introduction, Types, Exception Handling Techniques, User-Defined Exception.

Unit – III

Multithreading: Introduction, Main Thread, Creation of New Threads – By Inheriting the Thread Class or Implementing the Runnable Interface, Thread Lifecycle, Thread Priority, Synchronization. Input/Output: Introduction, java.io Package, File Class, FileInputStream Class, FileOutputStream Class, Scanner Class, BufferedInputStream Class, BufferedOutputStream Class, RandomAccessFile Class.

Unit – IV

Event Handling: Introduction, Types of Events, Example. AWT: Introduction, Components, Containers, Button, Label, Checkbox, Radio Buttons, Container Class, Layouts. Swing: Introduction, Differences between Swing and AWT, Jframe, Japplet, Jpanel, Components in Swings, Layout Managers, Jtable, DialogBox.

Database Handling Using JDBC: Introduction, Types of JDBC Drivers, Load the Driver, Establish Connection, Create Statement, Execute Query, Iterate Resultset, Scrollable Resultset, Developing a JDBS Application.

Text Book   Sachin Malhotra, Saurabh Choudhary, *Programming in Java(2e)*
Reference s   Bruce Eckel, *Thinking in Java (4e)*
                  Herbert Schildt, *Java: The Complete Reference (9e)*
                  Y. Daniel Liang, *Introduction to Java Programming (10e)*
                  Paul Deitel, Harvey Deitel, *Java: How To Program (10e)*
                  Cay S. Horsttnann*, Core Java Volume I – Fundamentals (10e)*

                  1 Thomas Wu, *An introduction to object-oriented programming with Java (5e)* Tony Gaddis, *Starting Out with Java From Control Structures Through Objects (6e)*

                  Jeanne Boyarsky, Scott Selikoff, *OCA: Oracle Certified Associate Java SE 8 Programmer–I Study Guide*

B.Sc. (Computer Science)

Semester -V

Java Lab   BS505

Practical   3 Hours/Week   1credit

	Write java programs to find the following a) largest of given three numbers
1	b) reverses the digits of a number c) given number is prime or not d) GCD of given two integers
2	Write java programs that implement the following a) default constructor b) parameterized constructor c) constructor overloading
3	a) Write a java program to find the smallest of given list integers using array and scannerclass. b) Write a java program for multiplication of two matrices.
4	a) Write a java program for demonstrating an inner classes or nested classes. b) Write a java program to implement method overloading, method overriding, dynamic method dispatch
5	Write a java program to implement single, multilevel, hierarchal, multiple, hybrid inheritances.
6	Write java programs that demonstrate the use of abstract, this, super, static, final key words
7	a) Write a java program for creating a package and using a package. b) Write a java program to demonstrate the use of wrapper classes.
8	a) Write a java program using all five keywords of exception handling mechanism. b) Write a java program for creating customized (user) exception
9	a) Write a java program that checks whether a given string is a palindrome or not. b) Write a java program for sorting a given list of names in ascending order.
10	a) Write a java program to create a file, write the data and display the data. b) Write a java program that reads a file name from user and displays its information.
11	a) Write a java program for controlling main thread. b) Write a java program for creating new thread by extending Thread class.
12	a) Write a java program for creating new thread by implementing Runnable interface. b) Write a java program for thread synchronization.
13	a) Write a java program to create following AWT components: Button, Checkbox, Choice, and List. b) Write java programs to create AWT application using containers and layouts.
14	a) Write java programs to create a simple Applet and create swing based Applet. b) Write a java program to handle different types of events in a swing application.
15	Write java programs to create a swing application using swing components and layouts.
16	Write a java program to store and retrieve data from database using JDBC.
17	Write the program using simple text editors (not IDE), compile and run from command prompt.

Note : Encourage students to develop small java applications using IDE, like giving as assignment. Write a small java application using some features of java.

B.Sc. (Computer Science)
Semester -VI

DSE–3F   Web Technologies   BS605

Theory	4Hours/Week	4credits
Practical	3 Hours/Week	1credit

Unit – I

Structuring Documents for the Web: Introducing HTML and XHTML, Basic Text Formatting, Presentational Elements, Phrase Elements, Lists, Editing Text, Core Elements and Attributes, Attribute Groups Links and Navigation: Basic Links, Creating Links with the <a> Element, Advanced E- mail Links.

Images, Audio, and Video: Adding Images Using the <img> Element, Using Images as Links Image Maps, Choosing the Right Image Format, Adding Flash, Video and Audio to your web pages. Tables: Introducing Tables, Grouping Section of a Table, Nested Tables, Accessing Tables

Forms: Introducing Forms, Form Controls, Sending Form Data to the Server

Frames: Introducing Frameset, <frame> Element, Creating Links Between Frames, Setting a Default Target Frame Using <base> Element, Nested Framesets, Inline or Floating Frames with <iframe>.

Unit – II

Cascading Style Sheets: Introducing CSS, Where you can Add CSS Rules.

CSS Properties: Controlling Text, Text Formatting, Text Pseudo Classes, Selectors, Lengths, Introducing the Box Model.

More Cascading Style Sheets: Links, Lists, Tables, Outlines, The :focus and :activate Pseudo classes Generated Content, Miscellaneous Properties, Additional Rules, Positioning and Layout with CSS

Page Layout: Understating the Site's Audience, Page Size, Designing Pages, Coding your Design, Developing for Mobile Devices.

Design Issues: Typography, Navigation, Tables, Forms.

Unit – III

Learning JavaScript: How to Add Script to Your Pages, the Document Object Model, Variables, Operators, Functions, Control Statements, Looping, Events, Built- In Objects,

Working with JavaScript: Practical Tips for Writing Scripts, Form Validation, Form Enhancements, JavaScript Libraries.

Putting Your site on the web: Meta tags, Testing your site, Talking the Leap to Live, Telling the World about your site, Understanding your visitors.

Unit – IV

XML - Introduction, XML Basics, Structuring Data, XML Namespaces, Document Type Definitions (DTDs), W3C XML Schema Documents, XML Vocabularies, Extensible Style sheet Language and XSL Transformations, Document Object Model (DOM).

Ajax-Enabled Rich Internet Applications: introduction, history of Ajax, traditional web applications Vs Ajax Applications, RIAs with Ajax, Ajax example using XML Http Request object, XML and DOM, creating full scale Ajax-enabled application, Dojo Toolkit.

Text Book   Jon Duckett, *Beginning HTML, XTML, CSS andJavaScript*
Reference s   Chris Bates, *Web Programming*
                  M. Srinivasan, *Web Technology: Theory and Practice*
                  Achyut S. Godbole, AtulKahate, *Web Technologies*

                  Kogent Learning Solutions Inc, *Web Technologies Black Book* Ralph Moseley and M. T. Savaliya, *Developing Web Applications*
                  P.J. Deitel& H.M. Deitel, *Internet and World Wide Web How to program*

B.Sc. (Computer Science)
Semester -VI

Web Technologies Lab   BS605

Practical   2 Hours/Week   1credit

1	a. Write a HTML program using basic text formatting tags, <hn>, <p>,
	, <pre>.
	b. Write a HTML page for Example Cafe using above text formatting tags.

2	a. WriteaHTMLprogramusingpresentationalelementtags<b>,<i>,<strike>,<sup>,<sub>, <big>, <small>,<hr> b.WriteaHTMLprogramusingphraseelementtags<blockquote>,<cite>,<abbr>,<acronym>, <kbd>, <address>
3	a. Write a HTML program using different list types. b. Write a HTML page that displays ingredients and instructions to prepare a recipe.
4	a. Write a HTML program using grouping elements <div> and<span>. b. Write a HTML Menu page for Example cafe site.
5	a. Write a HTML program using images, audios, videos. b. Write a HTML program to create your time table.
6	Write a HTML program to create a form using text inputs, password inputs, multiple line text input, buttons, check boxes, radio buttons, select boxes, file select boxes.
7	Write a HTML program to create a frames and links between frames.
8	Write a HTML program to create different types of stylesheets.
9	Write a HTML program to create CSS on links, lists, tables and generated content.
10	Write a HTML program to create your college web site using multi column layouts.
11	Write a HTML program to create your college web site using for mobile device.
12	Write a HTML program to create login form and verify username and password using DOM
13	a. Write a JavaScript program to calculate area of rectangle using function. b. Write a JavaScript program to wish good morning, good afternoon, good evening depending on the current time.
14	a. Write a JavaScript program using switch case?. b. Write a JavaScript program to print multiplication table of given number using loop.
15	a. Write a JavaScript programs using any 5events. b. Write a JavaScript program using JavaScript built in objects.
16	Write a JavaScript program to create registration form and validate all fields using form validation
17.	Write a XML Program to represent Student Data using DTD.
18.	Write a XML Program to represent Data using XML Schema Definition.

B.Sc. (Computer Science)
Semester -VI

Project/Optional   PHP with MySQL   BS606

	Theory	3 Hours/Week	3credits
	Practical	3 Hours/Week	1credit

Unit – I

Introducing PHP – What is PHP? Why use PHP? Evolution of PHP, Installing PHP, Other ways to run PHP, Creating your first script. PHP Language Basics – Using variables, Understanding Data Types, Operators and Expressions, Constants. Decisions and Loops – Making Decisions, Doing Repetitive Tasks with Looping, Mixing Decisions and Looping withHTML.

Strings – Creating and Accessing Strings, Searching Strings, Replacing Text with Strings, Dealing with Upper and Lowercase, Formatting Strings. Arrays – Creating Arrays, Accessing Array Elements, Looping Through Arrays with for-each, Working with Multidimensional Arrays, Manipulating Arrays.

Unit – II

Functions – What is a Function? Why Functions are useful? Calling Functions, Working with Variable Functions, Writing your own Functions, Working with References, Writing Recursive Functions.

Objects – Introduction OOP Concepts, Creating Classes and Objects in PHP, Creating and using Properties, Working with Methods, Object Overloading with _get(), _set() and _call(), Using Inheritance to Extend Power of Objects, Constructors and Destructors, Automatically Loading Class Files, Storing as Strings.

Handling HTML Forms with PHP – How HTML form works, Capturing Form Data with PHP, Dealing with Multi-Value Fields, Generating Web Forms with PHP, Storing PHP Variables in Forms, Creating File Upload Forms, Redirecting After a Form Submission.

Unit – III

Working with Files and Directories - Getting Information on Files, Opening and Closing Files, Reading and Writing to Files, Copying, Renaming, and Deleting Files, Working with Directories.

Introducing Databases and SQL – Deciding How to Store Data, Understanding Relational Databases, Setting Up MySQL, A Quick Play with MySQL, Connecting MySQL fromPHP.

Retrieving Data from MySQL with PHP – Setting Up the Book Club Database, Retrieving Data with SELECT, Creating a Member Record Viewer. Manipulating MySQL Data with PHP – Inserting, Updating, and Deleting Records, Building a Member Registration Application.

Text Book   Matt Doyle, *Beginning PHP 5.3* (Wrox – WileyPublishing)
Reference s   Ellie Quigley, *PHP and MySQL by Example*
                   Joel Murach, Ray Harris, *Murach's PHP and MySQL*
                   Brett McLaughlin, *PHP & MySQL: The Missing Manual*
                   Luke Welling, Laura Thomson, *PHP and MySQL Web Development*

                   W. Jason Gilmore, *Beginning PHP and MySQL From Novice to Professional* Andrew Curioso, Ronald Bradford, Patrick Galbraith, *Expert PHP and MySQL*

B.Sc. (Computer Science)
Semester -I

PHP with MySQLLab   BS606

Practical   3 Hours/Week   1credit

1 a) Write a PHP script to find the factorial of a given number.
   b) Write a PHP script to find the sum of digits of a given number.

2 a) Write a PHP script to find whether the given number is a prime or not.
   b) Write a PHP script to demonstrate the use of break, continue statements using nested loops.

3 a) Write a PHP script to display the Fibonacci sequence with HTML page.
   b) Write a PHP script to create a chessboard.

4 a) Write a PHP script using built-in string function like strstr(), strops(), substr_count(), etc...
   b) Write a PHP script to transform a string to uppercase, lowercase letters, make a string's first character uppercase

6 a) Write a PHP script that inserts a new item in an array in any position.
   b) Write a PHP function to check whether all array values are strings or not.

7 a) Write a PHP script to count number of elements in an array and display a range of array elements.
   b) Write a PHP script to sort a multi-dimensional array set by a specific key.

8 a) Write a PHP script using a function to display the entered string in reverse.
   b) Write a PHP script using function for sorting words in a block of text by length.

9 a) Write a PHP script for creating the Fibonacci sequence with recursive function.
   b) Write a PHP script using pass by value and pass by reference mechanisms in passing arguments to functions.

10 a) Write a PHP script to demonstrate the defining and using object properties.
    b) Write a PHP script to demonstrate the inheritance.

11 a) Write a PHP script to demonstrate the object overloading with _get(), _set(), and_call().
    a. Write a PHP script to demonstrate the overloading property accesses with _get() and _set().

12 a) Write a PHP script to demonstrate the method overloading and method overriding mechanisms.
    a. Write a PHP script to demonstrate the use of final classes and final methods.

13 a) Write a PHP script to demonstrate the use interfaces.
    a. Write a PHP script using constructors and destructors.

14 Write a PHP application to handling HTML forms with PHP script.

15 a) Write a PHP script to create a file, write data into file and display the file's data.
    a. Write a PHP script to check and change file permissions, copying, renaming and deleting files.

16 a) Write a PHP application for connecting to MySQL and reading data from database table.
    a. Write a PHP application for inserting, updating, deleting records in the database table.

17 Write a PHP application for student registration form.

Elaborations

Paper	Credits	Theory Exam		Practical Exam
		University Exam	Internal Exam	
DSC	4+1	80 Marks	20 Marks	25 Marks
DSE	4+1	80 Marks	20 Marks	25 Marks
SEC	2	40 Marks	10 Marks	No Practical
GE	4	80 Marks	20 Marks	No Practical
AECC	2	40 Marks	10 Marks	No Practical
P/O	3+1	60 Marks	15 Marks	25 Practical

DSC   – Discipline specific core course
DSE   – Discipline specific elective course
SEC   – Skill enhancement course
GE   – Generic elective
AECC - Ability Enhancement Compulsory
P/O   -Project/Optional

Time:3Hrs.   **Maximum marks:80**

PART -AAnswer any eight questions in part –A   8X4 M = 32 Marks

UNIT- I   1
              2
              3

UNIT- II   4
              5
              6

UNIT- III   7
              8
              9

UNIT- IV   10
              11
              12

          Part – B   Answer all Questions 12MX4 = 48 Marks

UNIT- I   13
              Or
              14

UNIT- II   15
              Or
              16

UNIT- III   17
 Or
              18

UNIT- IV   19
              Or
              20

Internal Exam (Theory)

Time:1Hr.   **Maximum marks:20**

- Two internal exams (one at the middle of the semester and the other at the end) of one-hour duration are to be conducted carrying 15 markseach.
- Average of the scores of two exams should be taken intoaccount.
- Following is the examinationpattern.
  - 10 MCQs (multiple choice questions) of half markeach,
  - 10 FIBs (Fill in the Blanks) of half markeach
  - 5 SAQs (short answered questions) of one markeach
  - Totaling 15marks.
  - 5 marks meant forassignment.

University Exam (Practical)

Time:2Hrs.   **Maximum marks:25**

- The question paper is to be typeset with **four** programs with due weightage to **all the units** from the question bank provided in thesyllabus.
- The candidates are to answer any **two** of them in the practicalexam.
- Each question has to carry **six** marks totaling **12**marks.
- Viva – **8**marks
- Record – **5**marks

University Exam (Theory)

Time:2Hrs.   **Maximum marks:40**

Section – A(4X 4M = 16 Marks)
Answer any four of the following six questions. Each carries four
marks.

Q1. From Unit 1
Q2. From Unit 1
03. From Unit 1
Q4. From Unit 2
Q5. From Unit 2
06. From Unit 2

Section – B (2 X 12M = 24Marks)
Answer all the following two questions. Each carries fifteen marks.
Q09. (a) or (b) from Unit 1
Q10. (a) or (b) from Unit 2

Internal Exam (Theory)
Time: 1/2Hr.   **Maximum marks:10**

- One internal exam at the end of the semester, of half an hour duration is to be conducted carrying 10marks.
- Following is the examinationpattern.
  - 10 MCQs (multiple choice questions) of one markeach,
        No assignment isrequired.

3 Hours   Max Marks -60   Credits -3

PART -AAnswer any Six questions in part –A   6X4 M = 24 Marks

UNIT- I   1
             2
             3

UNIT- II   4
             5
             6

UNIT- III   7
             8
             9

          Part – B   Answer all Questions 12MX3 = 36 Marks

UNIT- I   13
             Or
             14

UNIT- II   15
             Or
             16

UNIT- III   17
  Or
             18

29

Time:1Hr.   **Maximum marks:15**

- Two internal exams (one at the middle of the semester and the other at the end) of one-hour duration are to be conducted carrying 15 markseach.
- Average of the scores of two exams should be taken intoaccount.
- Following is the examinationpattern.
  - 10 MCQs (multiple choice questions) of half markeach,
  - 10 FIBs (Fill in the Blanks) of half markeach
  - 5 SAQs (short answered questions) of one markeach
  - Totaling 15marks.
  - No assignment required.

OSMANIA UNIVERSITY
FACULTY OF SCIENCE
B.Sc. (Computer Science)

Practical Question Paper(Project /optional)

3 HoursMax Marks -25   Credits -1

Answer any Two   6X2=12MARKS

UNIT – I   1 Program
UNIT- II   1 Program
UNIT-III   1 Program
UNIT-I or UNIT-II or UNIT-III   1 Program

      Viva -   8 Marks
      Record – 5 Marks

MOOCs [Massive Online Open Courses] Free Resources

E-Learning:

- NPTEL   :nptel.ac.in   [Core Subjects Certification]

- C++INSTITUTE   :cppinstitute.org   [C++ Certification]

- ORACLEEDUCATION   :education.oracle.com   [Java, DBMS Certification]

- BIG DATAUNIVERSITY   :bigdatauniversity.com   [Big Data Certification]

- COURSERA   :coursera.org   [Core Subjects Certification]

- CODEACADEMY   :codecademy.com   [Coding Certification]

- KHANACADEMY   :khanacademy.org   [Core Subjects Certification]

- PIXAR INABOX   :khanacademy.org/partner-content/pixar

- VIDEOLECTURES   :videolectures.net

- YOUTUBEEDU   :plus.google.com/+YouTubeEDU/posts

- DISNEYRESEARCH   :disneyresearch.com

- ALISON   :alison.com   [Core SubjectsCertification]

- INTERNETARCHIVE   :archive.org

Freeware:
- SCILAB   : scilab.org   [MatLab Equivalent]
- GEOGEBRA   :geogebra.org   [Software for Class Room Teaching]

Search Engine:

- WOLFRAMALPHA   :wolframalpha.com   [Computing Engine]

- CITESEER   :citeseerx.ist.psu.edu   [Searching Research Articles]

- DOAJ   :doaj.org   [Open Access to Journals]