GOVERNMENT DEGREE COLLEGE, GAMBHIRAOPET

Dist: Rajanna Sircilla- 505 304, TELANGANA STATE

(Affilicated to Satavahana University, Karimnagar)

Email: prl-gdc-ce@telangana.gov.in Mobile: 9908292166

PITLA DASS
M.A, SET, NET
Principal (FAC)

Certificate of
Attainment of Programme Outcomes (POs)
and Course Outcomes(Cs)

It is hereby certified that the Institution has stated and displayed the Programme Outcomes (POs) and Course Outcomes (COs) offered by the college on the website.

It is also certified that the Programme Outcomes (POs) and Course Outcomes (COs) have been attained and evaluated with the strategic plans of the Institution and the students have acquired all kinds of specific skills and abilities including theoretical and practical knowledge meant for imparting and attainment.

GOVERNMENT DEGREE COLLEGE GAMBHIRAOPET PIN:505304 Dist:Rajanna Sircilla

Principal

PRNICIPAL
GOVT. DEGREE COLLEGE
GAMBHIRAOPET-505304
RAJANNA SIRCILLA (DIST)T.S.

SATAVAHANA UNIVERSITY
KARIMNAGAR

FACULTY OF ARTS

TELUGU

CBCS Syllabus

2019-20

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ఈ సమావేశంలో ఈ క్రింది తీర్మానాలను

ఏకగ్రీవంగా ఆమోదిస్తూ తీసుకోవడమైనది.

డిగ్రీ మొదటి మరియు రెండవ సెమిస్టర్స్ CBCS సమూనాలో తెలుగు ద్వితీయ భాషగా రాష్ట్ర ఉన్నత విద్యామండలి ఆమోదించి పంపిన పాఠ్యప్రణాళికను కమిటీ సభ్యులందరూ సుదీర్ఘంగా చర్చించి రాష్ట్ర ఉ.వి.మ ఆమోదించి పంపిన పాఠ్యప్రణాళికను ఇక్కడపాటి మార్పులు - చేర్పులతో ఈ క్రింది విధంగా రూపొందించి శాతవాహన విశ్వవిద్యాలయ పరిధిలో అమలు చేయడానికి తీర్మానించనైనది.

తెలుగు - ద్వితీయభాష

మొదటి సంవత్సరం - మొదటి సెమిస్టర్

యూనిట్ — I

ప్రాచీన కవిత్వం :-

1. శకుంతలోపాఖ్యానం - నన్నయ - ఆం.మ.భా - ఆదిపర్వం (చ.4) ప.4 - 36 వరకు
2. గొడగూచికథ - పాల్కురికి సోమనాథుడు
   బసవపురాణం - తృతీయాశ్వాసం.

యూనిట్ — II

ఆధునిక కవిత్వం

1. కాసులు - గురజాడ అప్పారావు
2. గబ్బిలం - గుఱ్ఱం జాషువ (పంచముని దుస్థితిని గబ్బిలం ద్వారా శివునికి పంపించిన సందేశం)
   మొదటి భాగం - చిక్కిన కాసులు
3. గంగిరెద్దు - డా. పల్లా దుర్గయ్య - అంబ పలికిన ఓన్నల గంట గంటే ... నుండి పల్లె మీ ఊళ్ళు మీ యాటు ... గాను వరకు (21 పద్యాలు)
4. జయభేరి - శ్రీశ్రీ

యూనిట్ — III

ఉపవాచకం

1. రుద్రమదేవి (నవల) - ఒద్దిరాజు సోదరులు

యూనిట్ – IV

భాషాంశాలు

1. తెలుగు వాక్యభేదాలు
2. పర్యాయ పదాలు
3. నానార్థాలు

తెలుగు – ద్వితీయభాష

మొదటి సంవత్సరం – రెండవ సెమిస్టర్

యూనిట్ – I

ప్రాచీన కవిత్వం

1. గజేంద్ర మోక్షం – పోతన
2. హనుమత్ సందేశం – మొల్ల
3. సంభాషితాలు – ఏనుగు లక్ష్మణ కవి

యూనిట్ – II ఆధునిక కవిత్వం

1. స్నేహలత లేఖ – రాయప్రోలు సుబ్బారావు
2. అంతర్నాదం – దాశరథి కృష్ణమాచార్యులు
3. ప్రపంచ పదులు – డా. సి. నారాయణరెడ్డి
4. అల్విదా – కౌముది

యూనిట్ – III

వచన విభాగం

1. ఎంకన్న – ఆచార్య పాకాల యశోదారెడ్డి
2. మామిడిపండు – సురవరం ప్రతాపరెడ్డి
3. మా ఊరు పోయింది – దేవులపల్లి కృష్ణశాస్త్రి

యూనిట్ – IV

వ్యాకరణం

1. సంధులు
2. సమాసాలు

నోట్: ఛందస్సు మూడవ సెమిస్టర్‌లో పెట్టడానికి నిర్ణయించడమైనది. ఉన్నత విద్యామండలి రూపొందించి ఆమోదించిన మాదిరి ప్రశ్నాపత్రాన్ని యథాతథంగా ఆమోదించడమైనది.

3. పూర్వ ప్రత్యేక మండలాల పి.జి. కోర్సులకు సంబంధించి సభ్యులుగా విశ్వవిద్యాలయ అనుబంధ ప్రభుత్వ కళాశాలల నుండి పి.జి. కోర్సులు నిర్వహిస్తున్న వారి నుండి ఇద్దరు సభ్యులను ప్రస్తుతం ఉన్న సభ్యులతో పాటు బోర్డు ఆఫ్ స్టడీస్ లో అదనంగా చేర్చాలని తీర్మానించబడినది.

4. విశ్వవిద్యాలయ వివిధ అనుబంధ కళాశాలల్లో శాతవాహన విశ్వవిద్యాలయ పక్షాన విస్తృతోపన్యాసాలు, అధ్యయన సదస్సులు, సాహిత్య సదస్సులు నిర్వహించాలని కోరుతూ తీర్మానించడమైనది.

5. డిగ్రీ మాడ్రన్ తెలుగు (ML) మొదటి, రెండవ సెమిస్టరుల సిలబస్ గతంలో ఉన్నదానిని యథాతథంగా ఆమోదించడమైనది.

పేరు.	సంతకం.
1. ప్రొఫెసర్ కె. యాదగిరి.	[signature]
2 డా॥ K. రామకృష్ణ.	
3 డా॥ E. భద్రయ్య	[signature]
4 డా॥ బి చంద్రశేఖర్	B. [signature]
5 డా॥ వి. శివదేవి	V. [signature]
6 డా॥ పి. వనజారాణి	P. Vanaja Rani
7 డా॥ టి. చక్రధర స్వామి.	[signature]

ప్రత్యేక ఆహ్వానితులు: డా॥ కె. మల్లారెడ్డి. - [signature]

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B.A., B.Sc., B.Com., & B.B.A., (CBCS)
Syllabus - 2020
Telugu (Second Language)
3rd Semester

Unit - I. ప్రాచీన పద్యభాగం

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

Unit - II. ఆధునిక పద్యభాగం

1. రైతు ప్రశస్తి ... వానమామలై జగన్నాథాచార్యులు
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, అర్థాంతరన్యాస, శ్లేష, దృష్టాంతాలంకారాలు.

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

B.A., B.Sc., B.Com., & B.B.A., (CBCS)

Telugu (Second Language) - 2020

3rd Semester - Scheme of Question Paper

Time : 3 Hrs. Marks : 80

ఆ - 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

ఇ - 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.

B.A., B.Sc., B.Com., & B.B.A., (CBCS)
Syllabus - 2020
Telugu (Second Language)
4th Semester

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

B.A., B.Sc., B.Com., & B.B.A., (CBCS)

Telugu (Second Language) - 2020

4th Semester - Scheme of Question Paper

Time : 3 Hrs. Marks : 80

ఆ - భాగం (సంగ్రహ సమాధానాలు)

ఏవేవి 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

ఇ - 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)

SATAVAHANA UNIVERSITY : KARIMNAGAR

B.A., B.Sc., B.Com. & B.B.A (CBCS)
Syllabus - 2021-2022
Telugu (Second Language)
5th Semester

Unit -I కవితా ప్రక్రియలు

1) పద్యం
2) పాట
3) వచన కవిత
4) మినీ కవితా రూపాలు,
   హైకూ, నానీలు మినీ కవితలు
5) రుబాయీలు, గజల్

Unit -II తెలుగు వ్యాసం

6) వ్యాసం నిర్వచనం, లక్షణాలు
7) తెలుగు వ్యాస పరిణామక్రమం
8) వ్యాస రచనా పద్ధతులు
9) వ్యాస రచన భాషా ప్రయోగాలు
10) వ్యాసం -వస్తు వైవిధ్యం

Unit -III వచన సాహిత్యం

11) అధ్యయన-సంస్కృతి
12) సాహిత్య అధ్యయనం ప్రయోజనాలు
13) ముందుమాట
14) పుస్తక సమీక్ష
15) జానపద సాహిత్య పరిచయం

SATAVAHANA UNIVERSITY : KARIMNAGAR

B.A., B.Sc., B.Com. & B.B.A (CBCS)

Syllabus - 2021-2022

Telugu (Second Language)

6th Semester

Unit -I సాహిత్య ప్రక్రియల పరిచయం

1) నాటకం
2) నవల
3) కథానిక
4) జీవిత చరిత్ర
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 ENGLSIH
SATAVAHANA UNIVERSITY
UG General English (CBCS) First Year, Semester I (3 Units for 4 Credits)
From 2021-2022

Unit 1 (SHORT STORY) Dinakar	**TEXT**	**A Snake in the Grass - RK Narayan**
	Reading Comprehension	Satavahana Kingdom
	Grammar	Spelling Rules
	Vocabulary	Words Often Misspelt
	Pronunciation	Reading out a passage properly with punctuation pointers (audio support)
	Language Games	Twenty Quiz Items
	Conversation Practice	Talking about Weather
	Soft Skills	Effective Communication
Unit 2 (PROSE) E S Rao	**TEXT**	**On Saying Please – A.G. Gardinar**
	Reading Comprehension	Vemulavada
	Grammar	Framing Interrogatives
	Vocabulary	Words in different forms, Content and Structural / Grammatical Words
	Pronunciation	Intonation (audio support)
	Language Games	Tongue Twisters
	Conversation Practice	Talking about Sports and Games
	Soft Skills	Teamwork
Unit 3 (POETRY) Rambhaskar Raju	**TEXT**	**If You Forget Me – Pablo Neruda**
	Reading Comprehension	The Elagandala Fort
	Grammar	Verb Forms in 12 Tenses
	Vocabulary	Important Irregular Verbs in 5 Forms
	Pronunciation	Tone Groups (audio support)
	Language Games	Euphemisms / Indianisms
	Conversation Practice	Talking about Careers
	Soft Skills	Decision Making

DEPARTMENT OF ENGLSIH
SATAVAHANA UNIVERSITY
UG General English (CBCS) First Year, Semester II (3 Units for 4 Credits)

Unit 4 (SHORT FICTION) Ramesh	**TEXT**	**After the Sunset – Bhoopal**
	Reading Comprehension	Right to Information Act
	Grammar	Conversion
	Vocabulary	Connectors
	Pronunciation	Conversations (audio support)
	Language Games	Hangman / Word Endings
	Conversation Practice	Talking about Leaders
	Soft Skills	Creativity / Thinking Out of the Box
Unit 5 (PROSE) Praveen Kumar	**TEXT**	**Man's Peril - Bertrand Russell**
	Reading Comprehension	Digital India
	Grammar	Errors of Concord and Articles
	Vocabulary	Collocations
	Pronunciation	Stress Shift (audio support)
	Language Games	Spiderweb / Word Families
	Conversation Practice	Talking about Vegetables
	Soft Skills	Work Ethics
Unit 6 (POETRY) Shobha Rani	**TEXT**	**Be The Best – Douglas Malloch**
	Reading Comprehension	Good Governance
	Grammar	Errors of Verbs of Perception and Prepositions
	Vocabulary	Phrases
	Pronunciation	Words Often Mispronounced (audio support)
	Language Games	Word Jumble
	Conversation Practice	Talking about Social Media
	Soft Skills	Interpersonal Relations

Title of the Text – *English for Communication – I*
Published by Cambridge University Press
Author: G. Damodar

DEPARTMENT OF ENGLISH
SATAVAHANA UNIVERSITY
Textbook – *English for Communication – 2*
[Published by Cambridge University Press India Pvt. Ltd]
Author: Prof G. Damodar

Second Year; from 2021-22 onwards
Semester III (for 4 Credits)
Semester IV (for 4 Credits)

Unit 7 (SHORT FICTION)	**TEXT**	**'My Financial Career' by Stephen Leacock**
	Reading comprehension	Bathukamma (for literal with five forms of questions)
	Vocabulary	Synonyms, Suffixes
	Communication skills	Listening, Barriers to listening
	Writing skills	Note-taking and Note-making
	Soft skills	Multitasking
Content Developer	S. Rajesh Kumar	SRRGASC, Karimnagar
Unit 8 (PROSE)	**TEXT**	**'Student Mobs' by J. B. Priestly**
	Reading comprehension	Dr Dasarathi (for re-organization with five forms of questions)
	Vocabulary	Short forms (Contractions)
	Communication skills	Speaking
	Writing skills	Summarizing, Précis writing
	Soft skills	Critical thinking skills
Content Developer	G. Ramakrishna	SRRGASC, Karimnagar
Unit 9 (POETRY)	**TEXT**	**'Where the mind is Without Fear'by Rabindranath Tagore**
	Reading comprehension	Dr N. Bhaskar (for inference with five forms of questions)
	Vocabulary	Words for diary writing
	Communication skills	Oral presentation
	Writing skills	Diarywriting, Notice writing
	Soft skills	Stress management
Content Developer	J. Uma Maheshwari	SRRGASC, Karimnagar

Unit 10 (SHORT FICTION)	**TEXT**	**How I Taught My Grandmother to Read' by Sudha Narayana Murty**
	Reading comprehension	The Godavari River (for prediction with five forms of questions)
	Vocabulary	Antonyms, Prefixes
	Communication skills	Describing places: Dulikatta Stupa / Kondagattu/ Nagunur fort and temples
	Writing skills	Composition: Lower Manair Dam, NTPC
	Soft skills	Interpersonal skills
Content Developer	G. Harikrishna	Dept of English, Satavahana University

Unit 11(PROSE)	**TEXT**	**'Indian Identity Is Forged in Diversity...' by Shashi Tharoor**
	Reading comprehension	The Singareni Colleries (for personal response with five forms of questions)
	Vocabulary	One-word substitutes, Foreign words and phrases
	Communication skills	JAM (Just A Minute)
	Writing skills	Paragraph Writing – Writing lead lines for an event
	Soft skills	Motivational skills
Content Developer	Dr V. Pradeep Raj	Dept of English, Satavahana University
Unit 12 (POETRY)	**TEXT**	**'The Lotus' by Toru Dutt**
	Reading comprehension	The Nagoba Jatara (for evaluation with five forms of questions)
	Vocabulary	Minimal pairs
	Communication skills	Describing feelings
	Writing skills	Travelogue: Sivvaram Crocodile Sanctuary; Visit to Dr Jayashankar's village and Balasamudrum Park
	Soft skills	Time management
Content Developer	D. Vijay Prakash	Dept of English, Satavahana University

Semester Three (Second Year)*Objective: to promote students' study skills*

7. Note-taking and making, Cloze passages with the suggested words / Passages for Six Types of Comprehension with Five Forms of Questions **(for internal assessment)**
8. Precis-writing (a passage of 600 words to be written in columns by students)
9. Diary-writing (of daily / weekly / yearly activities, classes attended, things learnt, people met and lessons learnt from them, current views and opinions, thought for the day, importance of the day, etc), Notice-writing

Semester Four (Second Year)*Objective: to enhance students' vocabulary*

10. Antonyms and Synonyms (prefixes, suffixes, foreign words and phrases)
11. One-word substitutes / Idioms JAM Speeches **(for internal assessment)**
12. Minimal pairs (words often confused, misused, homophones, homographs, homonyms, etc)

DEPARTMENT OF ENGLISH
SATAVAHANA UNIVERSITY
Textbook – *English for Communication-3*
[Published by Cambridge University Press India Pvt. Ltd.]
Author: Prof G. Damodar

Final Year from 2021-22 onwards, Semester – V (for 3 Credits)

Unit 13 (NON-FICTION)	**TEXT (Biography, autobiography, speech, narration)**	**Swami Vivekananda's Speech, 11 September 1893, Chicago**
	Listening Tasks	Yoga and meditation
	Speaking Tasks	Hobbies and activities
	Reading Tasks	Vivekananda Memorial (for literal comprehension with five forms of questions)
	Technical Writing	Information transfer (of data, graphs, etc)
	Communication Skills	Picture Description
Content Developer	Dr E. Satyanarayana	Govt Degree College, Hanamkonda
Unit 14 (NON-FICTION)	**TEXT**	**Dr Kalam: 'My vision for India', IIT Hyderabad**
	Listening Tasks	Passages on Dr C. Narayan Reddy and Dr Naveen to be read out for note-making
	Speaking Tasks	Role-plays, Question tags in conversations
	Reading Tasks	Reading for prediction comprehension with five forms of questions
	Technical Writing	Resume-writing (with models of bio-data, one-page resume)
	Communication Skills	Topics of current happening, subject-oriented topics useful for competitive examinations
Content Developer	Dr S. Odelu Kumar	SRR Govt Degree & PG College, Karimnagar
Unit 15 (NON-FICTION)	**TEXT**	**First Woman Teacher of India: Savitribai Phule**
	Listening Tasks	Listening for information
	Speaking Tasks	Telephonic conversations
	Reading Tasks	Reading for inference, comprehension with five forms of questions
	Technical Writing	Letter-writing (formal letters, Statement of Purpose, etc.)
	Communication Skills	Questions in interviews, Tips on

		debates
Content Developer	Dr Ch. Joseleena leena_mnc@yahoo.com	SWRDC, Karimnagar
Semester – VI (for Credits 3)		
Unit 16 (NON-FICTION)	**TEXT (BIOGRAPHY, AUTOBIOGRAPHY, SPEECH, NARRATION)**	**Man is the Architect of his Own Future by G. Damodar**
	Listening Tasks	Listening for facts
	Speaking Tasks	Debates on current topics
	Reading Tasks	Reading for prediction comprehension with five forms of questions
	Technical Writing	Creating presentation slides
	Communication Skills	Seeking/Giving information
Content Developer	Dr B. Sudheer Kumar	KUWC, Warangal
Unit 17(NON-FICTION)	**TEXT**	**Mehta Gullie by Ved Prakash Mehta**
	Listening Tasks	Passage to be read out for opinions
	Speaking Tasks	Group discussion techniques
	Reading Tasks	Reading for evaluation, comprehension with five forms of questions
	Technical Writing	Letters of application
	Communication Skills	Inviting guests on to the dais
Content Developer	Dr K. Sudhaker	Dept of English, KU
Unit 18 (NON-FICTION)	**TEXT**	**PV Narasimha Rao: A Short Biography**
	Listening Tasks	Listening for theme
	Speaking Tasks	Mock interviews
	Reading Tasks	Reading for personal response comprehension with five forms of questions
	Technical Writing	Report writing, Organizing a meeting, Minutes of meeting
	Communication Skills	Proposing a Vote of Thanks
Content Developer	Ch. Maruthi	SRR Govt Degree & PG College, Karimnagar

GRADED GRADUATE GRAMMAR

(Topics of Grammar and Vocabulary – Year III)

Semester Five (Third Year) *Objective: to train students in composition with imagination*

1. Description of a picture / Information transfer (of data, graphs, etc.), Presentation Skills

(for internal assessment)

2. Resume-writing (with models of bio-data, one-page resume, detailed CV, etc.)
3. Topics of current happening, subject-oriented topics useful for competitive examinations

Semester Six (Third Year) *Objective: to train students in official communication*

4. Letter-writing (personal, business, official, job applications, SOP, etc.)
5. Dialogue-writing (discussing questions in interviews, hobbies, current topics with proper and appropriate words, phrases, registers, etc.) Debates, GDs **(for internal assessment)**
6. Report Writing / Minutes of a meeting (covering title, when (date and time), where, members attended, agenda circulated, resolutions taken, signatures, etc.)

Telangana State Council of Higher Education

Government of Telangana

Mathematics Course Structure

(B.Sc. Common Core Syllabus for All Universities of Telangana State 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.

SEMESTER-I

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 $f_{yz}(a, b)$ - 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 $x = f(y)$; $x = f(t)$, $y = \varphi(t)$; $r = f(\theta)$
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*

SEMESTER-II

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 $Q(x) = be^{ax}, b\sin ax/b\cos ax, bx^k, Ve^{ax}$ - 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.*

SEMESTER-III

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*

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*

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*

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*)

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*

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* (5e)

References:

- P R Halmos, *Naïve Set Theory*
- E Kamke , *Theory of Sets*

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 lntegers - 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*

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*

Few Websites

- NPTEL: nptel.ac.in
- COURSERA: www.coursera.org
- MITOCW: ocw.mit.edu
- ACADEMIC EARTH: www.academicearth.org
- EdX : www.edx.org
- KHAN ACADEMY :www.khanacademy.org
- ALISON: www.alison.com
- STANFORD ONLINE: www.online.stanford.edu
- VIDEO LECTURES: videolectures.net
- INTERACTIVE REAL ANALYSIS: mathcs.org
- VISUAL CALCULUS: archives.math.utk.edu/visual.calculus
- MOOCS CALCULUS: mooculus.osu.edu

Few Math Softwares

- Useful for Classroom teaching: *Geogebra (Freeware)*
- Type setting software:*LaTeX*
- High end commercial softwares: *Mathematica , Maple , Matlab*
- Answering search engine: www.wolframalpha.com
- Group theory software: *group explorer 2.2 (Freeware)*
- Visualization software: *Mathematics Visualization Toolkit (freeware)*

SATAVAHANA UNIVERSITY

B.Sc. (Physics)

SCHEME FOR CHOICE BASED CREDIT SYSTEM

(YEAR & SEMESTER - WISE SCHEME OF HPW, CREDITS & MARKS)

YEAR	SEM	Course/Paper	Course Type*	Hrs / Week	No. of Credits	Marks		
						Internal	SEM End	Total
FIRST	I	Mechanics & Oscillations	DSC-1	4	4	20	80	100
		Mechanics & Oscillations Lab (Practicals)	DSC-1(Pr)	3	1	-	25	25
	II	Thermal Physics	DSC-2	4	4	20	80	100
		Thermal Physics Lab (Practicals)	DSC-2(Pr)	3	1	-	25	25
SECOND	III	Electromagnetic Theory	DSC-3	4	4	20	80	100
		Electromagnetic Theory Lab (Practicals)	DSC-3(Pr)	3	1	-	25	25
		1) Experimental methods & Error analysis 2) Electrical circuits & Networking	SEC-1 SEC-2	2 2	2 2	10 10	40 40	50 50
	IV	Waves & Optics	DSC-4	4	4	20	80	100
		Waves & Optics Lab (Practicals)	DSC-4(Pr)	3	1	-	25	25
		1) Basic Instrumentation 2) Digital Electronics	SEC-3 SEC-4	2 2	2 2	10 10	40 40	50 50
THIRD	V	(A) Modern Physics Or (B) Computational Physics	DSE-1	4	4	20	80	100
		(A) Modern Physics Lab (Practicals) Or (B) Computational Physics Lab (Practicals)	DSE-1 (Pr)	3	1	-	25	25
		Renewable energy & Energy harvesting	GE	4	4	20	80	100
	VI	(A) Electronics Or (B) Applied Optics	DSE-2	4	4	20	80	100
		(A) Electronics Lab (Practicals) Or (B) Applied Optics Lab (Practicals)	DSE-2 (Pr)	3	1	-	25	25
		Nanoscience	Project / Course in lieu of project	4	4	20	80	100
Total					**30 + 16**	**120+80**	**630+320**	**750 + 400**

**DSC: Discipline Specific Course (Core);*
DSE: Discipline Specific Elective (Elective);
Pr: Practical
SEC: Skill Enhancement Course;
GE: Generic Elective

B.Sc. (Physics)- I Year
Semester – I
Paper – I: Mechanics and Oscillations
(DSC-1: Compulsory)

Total: 56 hrs
(4 Hrs / week)

Unit – I

1. Vector Analysis (14)

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

2. Mechanics of Particles (7)

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.

3. Mechanics of Rigid Bodies (7)

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

Unit – III

4. Central Forces (8)

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.

5. Special theory of Relativity (8)

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

6. Oscillations (12)

Simple harmonic oscillator and solution of the differential equation – Physical characteristics of SHM, Torsion pendulum – Measurement 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.*

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. **Fundamentals of Physics** by Alan Giambattista et al *Tata-McGraw Hill Company* Edition, 2008.
6. **University Physics** by Young and Freeman, *Pearson Education, Edition 2005*.
7. **Sears and Zemansky's University Physics** by Hugh D. Young, Roger A. Freedman *Pearson Education Eleventh Edition*.
8. **An introduction to Mechanics** by Daniel Kleppner & Robert Kolenkow. *The McGraw Hill Companies*.
9. **Mechanics**. Hans & Puri. *TMH Publications*.
10. **Engineering Physics**. R.K. Gaur & S.L. Gupta. *Dhanpat Rai Publications*.
11. **The Feymman Lectures in Physics, Vol.-1**, R P Feymman, RB Lighton and M Sands, BI Publications,
12. **Mechanics-**P.K. Srivastava - New Age International.

B.Sc. (Physics) – I year
Semester - I
Paper – I: Mechanics and Oscillations Practicals
(DSC-1: Compulsory)

1. Measurement of errors – Simple Pendulum.
2. Calculation of slope and intercept of 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 modulus by Torsion Pendulum.
8. Determination of surface tension of a liquid through capillary rise method.
9. Determination of Surface Tension of a liquid by any other method.
10. Determination of Viscosity of a fluid.
11. Observation of Lissajous figures from CRO- Frequency ratio. Amplitude 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.

B.Sc. (Physics)- I Year
Semester – II
Paper – II: Thermal Physics
(DSC-2: Compulsory)

Total: 56 hrs
(4 Hrs / week)

Unit – I

1. Kinetic theory of gases: (6)

Introduction – Deduction of Maxwell's law of distribution of molecular speeds, Transport Phenomena – Viscosity of gases – thermal conductivity – diffusion of gases.

2. 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

3. Thermodynamic potentials and Maxwell's equations: (7)

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.

4. Low temperature Physics: (7)

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

5. Quantum theory of radiation: (14)

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 pyroheliometer - determination of solar constant, effective temperature of sun.

Unit – IV

6. Statistical Mechanics: (14)

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.*

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. **Feyman's Lectures on Physics** Vol. 1,2,3 & 4. *Narosa Publications.*
10. **Introduction to Statistical Mechanics. ,** B.B. Laud, Macmillan, 1981
11. **Statistical Physics,** K.Haung, Wiley Eastern 1988

B.Sc. (Physics) – I year
Semester - II
Paper – II: Thermal Physics Practicals
(DSC-2: 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 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

B.Sc. (Physics)- II Year
Semester – III
Paper – III: Electromagnetic Theory
(DSC-3: Compulsory)

Total: 56 hrs
(4 Hrs / week)

Unit I : Electrostatics (14 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 (14 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 (14)
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 (7 Hrs)
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 (7 Hrs)
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).

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

Suggested Books:

1. Fundamentals of electricity and magnetism By Arthur F. Kip (McGraw-Hill, 1968)

2. Electricity and magnetism by J.H.Fewkes & John Yarwood. Vol.I (Oxford Univ. Press, 1991).

3. Introduction to Electrodynamics, 3rd edition, by David J. Griffiths, (Benjamin Cummings,1998).

4. Electricity and magnetism By Edward M. Purcell (McGraw-Hill Education, 1986)

5. Electricity and magnetism. By D C Tayal (Himalaya Publishing House,1988)

6. Electromagnetics by Joseph A.Edminister 2nd ed.(New Delhi: Tata McGraw Hill, 2006).

B.Sc. (Physics) – II year
Semester - III
Paper – III: Electromagnetic Theory Practicals
(DSC-3: Compulsory)

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:

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

B.Sc. (Physics) - II Year
Semester – IV
Paper – IV: Waves and Optics
(DSC-4: Compulsory)

Total: 56 Hrs
(4 Hrs / week)

Unit-I: Waves (14 Hrs)

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 midpoint 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: (14 Hrs)

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: (14 Hrs)

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 (14 Hrs)

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 AjoyGhatak. *The McGraw-Hill companies*.
2. **Optics** by Subramaniyam and Brijlal. *S. Chand & Co*.
3. **Fundamentals of Physics**. Halliday/Resnick/Walker.*C. Wiley India Edition 2007*.
4. **Optics and Spectroscopy**. R. Murugeshan and Kiruthiga Siva Prasath. *S. Chand & Co*.
5. **Second Year Physics** – *Telugu Academy.*
6. **Modern Engineering Physics** by A.S. Vasudeva. *S.Chand& Co. Publications*.
7. **Feyman's Lectures on Physics** Vol. 1,2,3 & 4. *Narosa Publications.*
8. **Fundamentals of Optics** by Jenkins A. Francis and White E. Harvey, *McGraw Hill Inc.*
9. **Physical Optics,** K. Ghatak
10. **Optical and Atomic Physics,** D.P. Khandelwal, Himalaya Publishing House, Bombay,1988
11. **Fundamental of Optics,** Jenkins and White, McGraw-Hill
12. **Optics,** Smith and Thomson, John Wiley and sons

B.Sc. (Physics) – II year
Semester - IV
Paper – IV: Waves and Optics Practicals
(DSC-4: 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.

B.Sc. (Physics)- III Year
Semester – V
Paper – V(A) : Modern Physics
(DSE-1: Elective)

Total : 56 Hrs
(4 Hrs / week)

UNIT - 1 : SPECTROSCOPY (14 Hrs)

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 Hrs)

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 (14 Hrs)

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: GMcounter, proportionalcounter, scintillationcounter.

UNIT:IV:Solid State Physics &Crystalography (14 Hrs)

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

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.

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

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 SivaPrasath.S. Chand & Co.
4. Nuclear Physics by D.C. Tayal, Himalaya PublishingHouse.
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.

B.Sc. (Physics) – III year
Semester – V
Paper- V(A) : Modern Physics Practicals
(DSE-1: Elective)

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.

B.Sc. (Physics) - III Year
Semester – V
Paper – V(B) : Computational Physics
(DSE-1: Elective)

Total: 56 hrs
(4 Hrs / week)

UNIT I: Programming in C (14 Hrs)
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: Numerical methods of Analysis (14 Hrs)
Solution of algebraic and transcendental equation, Newton Ramphan method, 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: Numerical solution of ordinary differential equations (14 Hrs)
Eulers 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 sampling, Rejection method.

UNIT IV: Computational methods (14 Hrs)
Metropolis algoritham, Molecular diffusion and Brownian motions, 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 Manto - Carlo simulations Statistical Physics: Land

B.Sc. (Physics) – III year
Semester – V
Paper – V(B) : Computational Physics Practicals
(DSE-1: Elective)

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 coefficients
4. Matrix Simulation: Subtraction and Multiplication.
5. Matrix Inversion and solution of simultaneous equations
6. Lagrange interpolation based on given input data
7. Numerical integration using the Simpsons method.
8. Numerical integration using the Gaussian quadrature method.
9. Solution of first order Differential Equation using 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.

B.Sc. (Physics) - III Year
Semester – VI
Paper – VI(A) : Electronics
(DSE-2: Elective)

Total: 56 hrs
(4 Hrs / week)

Unit - I: (14 Hrs)

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

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

Unit-II: (14 Hrs)

1. 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).

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

Unit-III: (14 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)

1. Digital Electronics

Binary number system, conversion 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.

2. 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. Basic Electronics for B.Sc (Physics) III Year, 2019, Telugu Academy
9. Digital Principles & Applications – A.P. Malvino and D.P. Leach

B.Sc. (Physics) – III year
Semester – VI
Paper-VI(A) : Electronics Practicals
(DSE-2: Elective)

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. Constructionof 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- I 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

Note: Minimum of eight experiments should be performed.

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.

B.Sc. (Physics)- III Year
Semester – VI
Paper – VI(B) : APPLED OPTICS
(DSE-2: Elective)

Total: 56 Hrs
(4 Hrs / week)

Unit I: Principles of LASER (14 Hrs)

Emission and absorption of Radiation, -Einstein Relations- Pumping Mechanism- optical feedback- Laser rate equation for two, three and Four level Lasers, pumping threshold condition- Principle of Lase 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: Holography (14 Hrs)

Basic principle 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-Fourier Transform Hologram-Volume Hologram- Applications of holograms.

Unit III: (14 Hrs)

Fourier and Non-Linear Optics: Thin lens as phase transformation-thickness function-various types of lenses- Fourier transforming properties of lenses-Object placed Infront of the lens- Object placed behind the lens.

Non-Linear Optics: harmonic generation- second hormonic generation-phase matching condition- Optical mixing- parametric generation of Light- Self focusing of light.

Unit IV: Optical Fibers (14 Hrs)

Fiber types and their structures.Ray optic representation, Acceptance angle and numerical aperture. Step index and graded index fibers. Sigle mode and multi-mode 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-JW Goodman
3. Lasers and Non linear Optics--BB Laud
4. Optical electronics – Ghatak and Thyagarajan
5. Principles of Lasers- O.Svelto
6. Optical fiber communication -By Geradkeiser
7. Optical fiber communication-by John M Senior (PHI)

B.Sc. (Physics) – III year
Semester – VI
Paper – VI(B) : Applied Optics Practicals
(DSE-2: Elective)

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 fiber
9. Measurement of bending losses in optical fiber
10. Study of audio signal transmission through optical fiber
11. To study the interference of light using optical fiber

Note: Minimum of eight experiments should be performed.

Suggested Books:

1. Introduction to fourier Optics- J Goodman
2. Optical Fiber Communication- John M senior
3. Principles of Lasers-by O.Svelto
4. Modern Optics by Grant Fowles
5. Principles of Optics by Born & Wolf
6. Fundamentals of Optics by Jekins & White

B.Sc. (Physics) - II Year
Semester – III
Experimental methods & Error analysis
(SEC - I)

Total: 28 Hrs
(2 Hrs / week)

Unit I: Experimental Methods (14 Hrs)

Least count of an instruments, Instruments for measuring mass, length, time, angle, current, voltage. Fundamental Units. Precession and accuracy of measurements, source of error in measurements, necessity of estimating errors, types of errors, reading error of instrument, Calibration error, random error, system error, Significant digits, order of magnitude and rounding of numbers, rounding error, absolute and relative error. Errors of computation- addition, subtraction, multiplication, division error in power and roots, propagation errors, analysis of data, standard deviation, calculation of mean value.

Unit II: I Statistical analysis of errors (14 Hrs)

Mean, 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

Suggested Book:

1. The theory of errors in Physical Measurements JC Pal New central book agency -2010

B.Sc. (Physics) - II Year
Semester – III
Electrical circuit Networking
(SEC - II)

Total: 28 Hrs
(2 Hrs / week)

Unit I: (16 Hrs)

Basic electricity principles: Voltage, current, resistance and power – Ohm's law – Series, parallel and series-parallel combinations of resistances – AC electricity and DC electricity – Familiarization with multimeter, voltmeter and ammeter

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 identification of 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 and motors – Speed & power of AC motor

Solid state devices: Resistors, inductors and capacitors – Diode and rectifiers – Components in series or parallel – Response inductors and capacitors with DC or AC sources

Unit-II: (12 Hrs)

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 too measure current, voltage and power in DC and AC circuits – Insulation – Solid and stranded cable, conduit, cable trays – Splices: wire nuts, 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

Suggested Books:

1. A text book in electrical technology – B. L. Thereja – S. Chand & Co.
2. A text book of electrical technology – A. K. Thereja
3. Performance and design of AC machines – M. G. Say – ELBS Edn

B.Sc. (Physics)- II Year
Semester – IV
Basic Instrumentation
(SEC - III)

Total: 28 Hrs
(2 Hrs / week)

Unit I: (14 Hrs)

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 and ac current, resistance – Specifications of a multimeter and their significance

Electronic voltmeter: Advantage over conventional multimeter for voltages measurement with respect to input impedance and sensitivity – Principles of voltage measurement (Block diagram only) – Specifications of an Electric voltmeter, multimeter and their significance - AC millivoltmeter: Types of AC millivoltmeters – Block diagram of AC millivoltmeter Amplifier-rectifier and Rectifier-amplifier – Specifications and their significance

Cathode Ray Oscilloscope (CRO): Block diagram of CRO – construction of CRT – electron gun – electrostatic focusing and acceleration (Qualitative only) – Brief description of screen phosphor, visual persistence and chemical composition – Time-base operation – synchronization – front panel controls – specifications of 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: (14 Hrs)

Signal generators and Analysis instruments: Block diagram, explanation and specifications of low frequency signal generator, pulse generator and function generator – Concept of 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 digital meter – working principles of digital voltmeter.

Digital multimeter: Block diagram and working of digital multimeter – working principle - 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.*

Suggested Books:

1. A text book in electrical technology – B. L. Thereja – S. Chand & Co.
2. Performance and design of AC machines – M. G. Say – ELBS Edn
3. Digital circuits and systems – Venugopal, Tata McGraw Hill, 2011
4. Logic circuit design – Shimon P. Vingron, Springer, 2012
5. Digital electronics – Subrata Ghoshal, Cengage Learning, 2012
6. Electronic devices and circuits – S. Salivahanan & N. S. Kumar, 3rd Edn, 2012, Tata McGraw Hill
7. Electronic circuits: Hand Book of design and applications – U. Tietze & Ch. Schenk, Springer, 2012
8. Electronic devices – Thomas L. Floyd, 7th Edn., Pearson India, 2008

B.Sc. (Physics) - II Year
Semester – IV
Digital Electronics
(SEC - IV)

Total: 28 Hrs
(2 Hrs / week)

Unit I (14 Hrs)

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, Excess-3 code, grey code, ASCII code.
Logic gates: OR, AND, NOT, EX-OR, NAND, NOR, Universal gates.
Half adder and Full adder.

Unit II: (14 Hrs)

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

Suggested Books:

1. Electronic Devices and circuits - Jacob Milliman, Christos C. Haikais and satyabrata Jit, Mc Graw Hill (India) Pvt. Ltd, 2010
2. Op-Amps and Linear Integrated circuits – P. Ramakanth and Gaykward, 4th edition PHI, 2000
3. Electronic measurements and instrumentation Technology - William D cooper and Ad Helfrick, PHI, 2002
4. Electronic devices and circuits – S. Shalivahan and N. Sureshkumar 2nd Edn, Mc Graw Hill, Pvt. Ltd., 2007.
5. Basic Electronics for B.Sc (Physics) III Year, 2019, Telugu Academy

B.Sc. (Physics)- III Year
Semester – V
Renewal energy & Energy harvesting
(GE)

Total: 56 Hrs
(4 Hrs / week)

Unit I: Principles of Solar Radiation and Collection (Qualitative only) (14Hrs)

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.

Unit II: Solar Energy Storage and Applications (14Hrs)

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.

Unit III: Wind and Bio-Mass Energy (14Hrs)

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.

Unit IV: Geothermal and Ocean Energy (14Hrs)

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.

Suggested Books:

1. Non-Conventional Energy Sources - G.D Rai, Khanna Publishers
2. Renewable Energy Resources - Twidell & Wier, CRC Press (Taylor & Francis)
3. Renewable energy resources - Tiwari and Ghosal, Narosa.
4. Renewable Energy Technologies - Ramesh & Kumar, Narosa
5. Non-Conventional Energy Systems - K Mittal, Wheeler
6. Renewable energy sources and emerging technologies - D.P. Kothari, K.C. Singhal.

B.Sc. (Physics)- III Year
Semester – VI
Nano Science
(Paper in lieu of project)

Total: 56 Hrs
(4 Hrs / week)

Unit I: (12 Hrs)

Length scales in physics and Nano structures: 1D, 2D and 3D nano structures (nanodots, thin films, nanowires, nanorods), Band structure and density of states of materials at nano scale – Size effects in nano systems – Quantum confinement in 3D, 2D and 1D nano structures and its consequences

Unit II: (16 Hrs)

Synthesis of Nano structure 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 Microscope (SEM) – Transmission Electron Microscope (TEM) – Atomic Force Microscope (AFM) – Scanning Tunneling Microscope

Unit III: (14 Hrs)

Optical properties: Coulomb interaction in nano structures – concept of dielectric constant for nano structures and charging of nano structure – 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 hetero structures and nano structures

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 Hrs)

Applications: Applications of nano particles, quantum dots, nanowires and thin films for photonic devices (LED, solar cells) – Single electron devices (Qualitative only) – CNT based transistors – Nano material devices: Quantum dots – hetero structure Lasers

Optical switching and optical data storage – Magnetic quantum well – magnetic dots – magnetic data storage – Micro Electromechanical Systems (MEMS), Nano Electromechanical Systems (NEMS)

Suggested Books:

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

SCHEME OF QUESTION PAPER

B.Sc. (PHYSICS) I/II/III Year Examination
Semester: I/II/III/IV/V/VI
Paper:
(For DSC, DSE, GE & Paper in lieu of project)

Time: 3 Hours] **[Marks: 80**

SECTION A: SHORT ANSWER QUESTIONS (8 X 4 = 32)

Answer Any EIGHT questions. Each question carries equal marks

1. From Unit 1
2. From Unit 1
3. From Unit 1 (Problem)
4. From Unit 2
5. From Unit 2
6. From Unit 2 (Problem)
7. From Unit 3
8. From Unit 3
9. From Unit 3 (Problem)
10. From Unit 4
11. From Unit 4
12. From Unit 4 (Problem)

SECTION B: ESSAY TYPE ANSWER QUESTIONS (4 X 12 = 48)

Answer Any FOUR questions. All questions carry equal marks

13. (a) From Unit 1

    OR

    (b) From Unit 1

14. (a) From Unit 2

    OR

    (b) From Unit 2

15. (a) From Unit 3

    OR

    (b) From Unit 3

16. (a) From Unit 4

    OR

    (b) From Unit 4

SCHEME OF QUESTION PAPER

B.Sc. (PHYSICS) II Year Examination
Semester: III/IV
Paper:
(For SEC)

Time: 2 Hours] **[Marks: 40**

SECTION A: SHORT ANSWER QUESTIONS (4 X 4 = 16)

Answer Any FOUR questions. Each question carries equal marks

1. From Unit 1
2. From Unit 1
3. From Unit 1 (Problem)
4. From Unit 2
5. From Unit 2
6. From Unit 2 (Problem)

SECTION B: ESSAY TYPE ANSWER QUESTIONS (2 X 12 = 24)

Answer Any TWO questions. All questions carry equal marks

7. (a) From Unit 1

   OR

   (b) From Unit 1

8. (a) From Unit 2

   OR

   (b) From Unit 2

TELANGANA STATE COUNCIL OF HIGHER EDUCATION
PROPOSED CBCS COMMON CORE SCHEME FOR B.SC. COURSE
OPTIONAL -1: BOTANY

CODE	PAPER TITTLE	Course Type	HPW	Credits
	FIRST YEAR SEMSTER - I			
BS 104	PAPER-I : Microbial Diversity and Lower Plants	DSC-1A	4T+2P=6	4+1=5
	FIRST YEAR SEMSTER - II			
BS 204	PAPER-II: Gymnosperms, Taxonomy of Angiosperms and Ecology	DSC-1B	4T+2P=6	4+1=5
	SECOND YEAR SEMSTER - III			
BS 301	SEC-1: Nursery and Gardening	SEC-1	2	2
BS 302	SEC-2: Biofertilizers and Organic Farming	SEC-2	2	2
BS 304	PAPER-III: Plant Anatomy and Embryology	DSC-1C	4T+2P=6	4+1=5
	SECOND YEAR SEMSTER - IV			
BS 401	SEC-3: Greenhouse Technology	SEC-3	2	2
BS 402	SEC-4: Mushroom Culture Technology	SEC-4	2	2
BS 404	PAPER-IV : Cell Biology, Genetics & Plant Physiology	DSC-1D	4T+2P=6	4+1=5
	THIRD YEAR SEMESTER - V			
BS 501	GE-1: Industrial Microbiology	GE-1	4T	4
BS 502	DSE -1A: Biodiversity & Conservation DSE -1B: Economic Botany DSE -1C: Seed Technology	DSE-1A / DSE-1B / DSE-1C	4+2	4+1
	THIRD YEAR SEMESTER – VI			
BS 601	DSE-3: Project (Group Projects)	PROJECT	4	4
BS 602	DSE -2A: Plant Molecular Biology DSE -2B: Tissue Culture and Biotechnology DSE -2C: Analytical Techniques in Plant Sciences	DSE-2A / DSE-2B / DSE-5E	4T+2P=6	4+1=5

AECC: Ability Enhancement Compulsory Course, **SEC:** Skill Enhancement Course, **GE:** Generic Elective, **DSC:** Discipline Specific Core, **DSE:** Discipline Specific Elective.

Annexure – I (Credits)
Proposed CBCS Scheme for B.Sc.
w.e.f 2019-20

Courses		Papers	Total Credits	Credits for each paper / Semester B.Sc.					
				I	II	III	IV	V	VI
Core Courses DSC	Optional-1	4	20	5	5	5	5	-	-
	Optional-2	4	20	5	5	5	5	-	-
	Optional-3	4	20	5	5	5	5	-	-
Elective Courses DSE	Optional-1	2	10	-	-	-	-	5	5
	Optional-2	2	10	-	-	-	-	5	5
	Optional-3	2	10	-	-	-	-	5	5
Language	English(First Language)	5	20	4	4	3	3	3	3
	Second Language	5	20	4	4	3	3	3	3
Ability Enhancement Compulsory Course AECC	Environmental Science / Basic Computer Skills	1	2	2	-	-	-	-	-
	Basic Computer Skills / Environmental Science	1	2	-	2	-	-	-	-
Skill Enhancement Course SEC	SEC1	1	2	-	-	2	-	-	-
	SEC2	1	2	-	-	2	-	-	-
	SEC3	1	2	-	-	-	2	-	-
	SEC4	1	2	-	-	-	2	-	-
Generic Elective GE	Open Stream	1	4	-	-	-	-	4	-
Project Work/Optionals		1	4	-	-	-	-	-	4
Total Credits in each semester				25	25	25	25	25	25
Total Credits in UG				150					
Credits under Non-CGPA		NSS /NCC /sports / Extra curricular	6	Upto 6 (2 in each year)					
		Summer Internship	4	Upto 4 (2 in each, after I & II years)					

Annexure II

Proposed New Grading System

SGPA (SEMESTER GRADE POINT AVERAGE)			
S. No.	Grade Point	Range of marks	Grade Letter
1	10	Equal to and above 90 Marks	A+
2	9	More than or equal to 80 and less than 90 Marks	A
3	8	More than or equal to 70 and less than 80 Marks	B+
4	7	More than or equal to 60 and less than 70 Marks	B
5	6	More than or equal to 55 and less than 60 Marks	C+
6	5	More than or equal to 50 and less than 55 Marks	C
7	4	More than or equal to 40 and less than 50 Marks	D
8	0	Below 40 Marks	F

B.Sc., BOTANY

First Year, I -Semester

Paper-I

Microbial Diversity and Lower Plants

DSC - 1A (4 hrs./week) Credits- 4

(60 hours)

Theory Syllabus

(15 hours)

UNIT - I

1) **Bacteria:** Structure, nutrition, reproduction and economic importance. Brief account of Archaebacteria, Actinomycetes and Mycoplasma with reference to little leaf of Brinjal and Papaya leaf curl

2) **Viruses:** Structure, replication and transmission; plant diseases caused by viruses and their control with reference to Tobacco Mosaic and Rice Tungro.

3) An outline of plant diseases of important crop plants caused by bacteria and their control with reference to Angular leaf spot of cotton and Bacterial blight of Rice.

(15 hours)

UNIT-II

1) General characters, structure, reproduction and classification of algae (Fritsch)

2) **Cyanobacteria:** General characters, cell structure their significance as biofertilizers with special reference to Oscillatoria, Nostoc and Anabaena.

3) Structure and reproduction of the following:
Chlorophyceae- Volvox, Oedogonium and Chara.
Phaeophyceae- Ectocarpus
Rhodophyceae- Polysiphonia.

(15 hours)

UNIT-III

1) General characters and classification of fungi (Ainsworth).

2) Structure and reproduction of the following:
   (a) Mastigimycotina- Albugo
   (b) Zygomycotina- Mucor
   (c) Ascomycotina- Saccharomyces and Penicillium.
   (d) Basidiomycotina- Puccinia
   (e) Deuteromycotina- Cercospora.

3) Economic importance of lichens

(15 hours)

UNIT-IV

1) **Bryophytes:** Structure, reproduction, life cycle and systematic position of Marchantia, Anthoceros and Polytrichum, Evolution of Sporophyte in Bryophytes.

2) **Pteridophytes:** Structure, reproduction, life cycle and systematic position of Rhynia, Lycopodium, Equisetum and Marsilea.

3) Stelar evolution, heterospory and seed habit in Pteridophytes.

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References:

1) Alexopolous, J. and W. M. Charles. 1988. Introduction to Mycology. Wiley Eastern, New Delhi.
2) Mckane, L. and K. Judy. 1996. Microbiology – Essentials and Applications. McGraw Hill, New York.
3) Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
4) Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd, New Delhi.
5) Sambamurthy, A. V. S. S. 2006. A Textbook of Plant Pathology. I. K. International Pvt. Ltd., New Delhi.
6) Sambamurthy, A. V. S. S. 2006. A Textbook of Algae. I. K. International Pvt. Ltd., New Delhi.
7) Sharma, O. P. 1992. Textbook of Thallophyta. McGraw Hill Publishing Co., New Delhi.
8) Thakur, A. K. and S. K. Bassi. 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.
9) Vashishta, B. R., A. K. Sinha and V. P. Singh. 2008. Botany for Degree Students: Algae. S. Chand& Company Ltd, New Delhi.
10) Vashishta, B. R. 1990. Botany for Degree Students: Fungi, S. Chand & Company Ltd, New Delhi.
11) Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
12) Watson, E. V. 1974. The structure and life of Bryophytes, B. I. Publications, New Delhi.
13) Pandey, B. P. 2006. College Botany, Vol. II: Pteridophyta, Gymnosperms and Paleobotany. S. Chand & Company Ltd, New Delhi.
14) Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany - Pteridophyta (Vascular Cryptogams). . Chand & Company Ltd, New Delhi.
15) Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
16) Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd, New Delhi.
17) Thakur, A. K. and S. K. Bassi. 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.
18) Vashishta, B. R., A. K. Sinha and Adarsha Kumar. 2008. Botany for Degree Students: Bryophyta. S. Chand & Company Ltd, New Delhi.

Practical Syllabus (45 hours)

1. Study of viruses and bacteria using electron micrographs (photographs).
2. Gram staining of Bacteria.
3. Study of symptoms of plant diseases caused by viruses, bacteria, Mycoplasma and fungi:
   Viruses: Tobacco mosaic
   Bacteria: Angular leaf spot of cotton and Rice tungro.
   Mycoplasma: Little leaf of Brinjal and Leaf curl of papaya
   Fungi: White rust on Crucifers, Rust on wheat & Tikka disease of Groundnut.
4. Vegetative and reproductive structures of the following taxa:
   Algae: Oscillatoria, Nostoc, Volvox, Oedogonium,Chara ,Ectocarpus and Polysiphonia.
   Fungi: Albugo, Mucor,Saccharomyces, Penicillium, Puccinia and Cercospora
5. Section cutting of diseased material infected by Fungi and identification of pathogens as per theory syllabus. White rust of Crucifers, Rust on wheat & Tikka disease of Groundnut.
6. Lichens: Different types of thalli and their external morphology
7. Examination of important microbial, fungal and algal products:
   Biofertilizers, protein capsules, antibiotics, mushrooms, Agar-agar etc.
8. Field visits to places of algal / microbial / fungal interest (e.g. Mushroom cultivation, water bodies).
9. Study of Morphology (vegetative and reproductive structures) and anatomy of the following Bryophytes: Marchantia, Anthoceros and Polytrichum.
10. Study of Morphology (vegetative and reproductive structures) and anatomy of the following Pteridophytes: Lycopodium, Equisetum and Marsilea.
11. Study of Anatomical features of Lycopodium stem, Equisetum stem and Marsilea petiole & rhizome by preparing double stained permanent mounts.

Practical Model Paper

Max. Marks: 25

Time : 3 hrs

1. Identify the given components 'A'&'B' in the algal mixture .
   Describe with neat labeled diagrams & give reasons for the classifications. — 2 X 2 = 4M
2. Classify the given bacterial culture 'D' using Gram – staining technique. — 3M
3. Take a thin transverse section of given diseased material 'E'.
   Identify & describe the symptoms caused by the pathogen. — 4M
4. Identify the given specimens 'F', 'G' & 'H' by giving reasons .
   (Fungal-1, Bacteria-1 & Viral-1) — 3 X 1 = 3M
5. Comment on the given slides 'I' & 'J' (Algae-1, Fungi-1) — 2 X 2 = 4M
6. Identify the given specimen 'K' & slide 'L' (Bryophytes & Pteridophytes) — 2 X 2 = 4M
7. Record — 3M

B.Sc., BOTANY

First Year, II -Semester

Paper-II
Gymnosperms, Taxonomy of Angiosperms and Ecology

DSC-1B **Credits-4**

Theory Syllabus **(60 hours)**

UNIT-I **(15 hours)**

1) Gymnosperms: General characters, structure, reproduction and classification (Sporne's). Distribution and economic importance of Gymnosperms.
2) Morphology of vegetative and reproductive parts, systematic position and life cycle of Pinus and Gnetum,
3) Geological time scale Introduction to Palaeobotany, Types of fossils and fossilization, Importance of fossils.

UNIT-II (15 hours)

1) Introduction: Principles of plant 4ystematic, Types of classification: Artificial, Natural and Phylogenetic; Systems of classification: Salient features and comparative account of Bentham & Hooker and Engler & Prantl classification systems. An introduction to Angiosperm Phylogeny Group (APG).
2) Current concepts in Angiosperm Taxonomy: Embryology in relation to taxonomy Cytotaxonomy, Chemotaxonomy and Numerical Taxonomy.
3) Nomenclature and Taxonomic resources: An introduction to ICN, Shenzhen code – a brief account. Herbarium: Concept, techniques and applications.

UNIT-III (15 hours)

1) Systematic study and economic importance of plants belonging to the following families: Polypetalae Annonaceae, Capparidaceae, Rutaceae, Fabaceae (Faboideae/Papilionoideae, Caesalpinioideae, Mimosoideae), Cucurbitaceae
2) Gamopetalae: Apiaceae, Asteraceae, Asclepiadaceae, Lamiaceae, Monochalmydeae: Amaranthaceae, Euphorbiaceae
3) Monocotyledons: Orchidaceae, Poaceae and Zingeberaceae.

UNIT-IV (15 hours)

1. Component of eco system, energy flow, food chain and food webs.
2. Plants and environment, ecological adaptations of plants, Hydrophytes, Xerophytes and Mesophytes
3. Plant Succession serial stages, modification of environment, climax formation with reference to Hydrosere and Xerosere.

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References:

1. Watson, E. V. 1974. The structure and life of Bryophytes, B. I. Publications, New Delhi.
2. Pandey, B. P. 2006. College Botany, Vol. II: Pteridophyta, Gymnosperms and Palcobotany. S. Chand & Company Ltd, New Delhi.
3. Sporne, K. R. 1965. Morphology of Gymnosperms. Hutchinson Co., Ltd., London.
4. Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany - Pteridophyta (Vascular Cryptogams). . Chand & Company Ltd, New Delhi.
5. Pandey, B. P. 2001. College Botany, Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd, New Delhi.
6. Pandey, B. P. 2007. Botany for Degree Students: Diversity of Microbes, Cryptogams, Cell Biology and Genetics. S. Chand & Company Ltd, New Delhi.
7. Thakur, A. K. and S. K. Bassi. 2008. A Textbook of Botany: Diversity of Microbes and Cryptogams. S. Chand & Company Ltd, New Delhi.
8. Vashishta, B. R., A. K. Sinha and Adarsha Kumar. 2008. Botany for Degree Students: Bryophyta. S. Chand & Company Ltd, New Delhi.
9. Vashishta, P. C., A. K. Sinha and Anil Kumar. 2006. Botany for Degree Students: Gymnosperms. Chand & Company Ltd, New Delhi.
10. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
11. Pandey, B. P. 2007. Botany for Degree Students: Diversity of Seed Plants and their Systematics, Structure, Development and Reproduction in Flowering Plants. S. Chand & Company Ltd, New Delhi
12. Stace, C. A. 1989. Plant Taxonomy and Biostatistics (2nd Ed.). Edward Arnold, London.
13. Singh, G. 1999. Plant Systematics: Theory and Practice. Oxford and IBH, New Delhi.
14. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.
15. Davis, P. H. and V. H. Heywood. 1963. Principles of Angiosperm Taxonomy. Oliver and Boyd, London.
16. Heywood, V. H. 1965 . Plant Taxonomy. ELBS , London.
17. Heywood, V. H. and D. M. Moore (Eds). 1984. Current Concepts in Plant Taxonomy. Academic Press, London.
18. Jeffrey, C. 1982. An Introduction to Plant Taxonomy. Cambridge University Press, Cambridge. London.
19. Michael, S. 1996, Ecology, Oxford University Press, London
20. Odum, E.P. 1983. Basics of Ecology, Saunder's International Students Edition, Philadelphia.
21. Sharma P.D. 1989. Elements of Ecology, Rastogi Publications, Meerut

B.Sc. BOTANY
II Year: Semester-III
Paper – III: Plant Anatomy and Embryology

DSC - 1C — Credits- 4

Theory Syllabus — (60 hours)

UNIT – I — **(18h)**

1. Meristems: Types, histological organization of shoot and root apices and theories.
2. Tissues and Tissue Systems: Simple, complex and special tissues.
3. Leaf: Ontogeny, diversity of internal structure; stomata and epidermal outgrowths.
4. General account of adaptations in xerophytes and hydrophytes.

UNIT - II — **(16h)**

5. Stem and root anatomy: Vascular cambium - Formation and function.
6. Anomalous secondary growth of Stem - *Achyranthes*, *Boerhaavia*, *Bignonia*, *Dracaena*; Root– *Beta vulgaris*
7. Wood structure: General account. Study of local timbers – Teak (*Tectona grandis*), Rosewood (*Dalbergia latifolia*), Red sanders (*Pterocarpus santalinus*), Nallamaddi (*Terminalia tomentosa*) and Neem (*Azadirachta indica*).

UNIT – III — **(10h)**

8. History and importance of Embryology.
9. Anther structure, Microsporogenesis and development of male gametophyte.
10. Ovule structure and types; Megasporogenesis; types and development of female gametophyte.

UNIT-IV — **(16h)**

11. Pollen morphology, pollination and fertilization, Pollination Types, Pollen – pistil interaction, Double fertilization.
12. Seed – structure appendages and dispersal mechanisms
13. Endosperm – Development and types. Embryo development and types; Polyembryony and Apomixis - an outline.

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References:

1. Bhattacharya et. al. 2007. A textbook of Palynology, Central, New Delhi.
2. Bhojwani, S. S. and S. P. Bhatnagar. 2000. The Embryology of Angiosperms (4th Ed.). Vikas Publishing House, Delhi.
3. M.R.Saxena- A textbook of Palynology.
4. Vashista- A textbook of Anatomy.
5. P.K.K.Nair- A textbook of Palynology.
6. Esau, K. 1971. Anatomy of Seed Plants. John Wiley and Son, USA.
7. Johri, B. M. 1984. Embryology of Angiosperms. Springer-Verleg, Berlin.
8. Kapil, R. P. 1986. Pollination Biology. Inter India Publishers, New Delhi.
9. Maheswari, P. 1971. An Introduction to Embryology of Angiosperms. McGraw Hill Book Co., London.
10. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.

B.Sc. BOTANY

II Year: Semester-III

Paper – III: Plant Anatomy and Embryology

DSC - 1C Credits- 1

Practical syllabus (45 hours)

1. Demonstration of double staining technique
2. Tissue organization in root and shoot apices using permanent slides
3. Preparation of double stained Permanent slides

   Primary structure: Root – *Cicer, Canna*; Stem – *Tridax, Sorghum*

   Secondary structure: Root – *Tridax* sp.; Stem – *Pongamia*

   Anomalous secondary structure: Examples as given in theory syllabus.
4. Anatomy of Xerophyte (*Nerium* leaf), Hydrophyte (*Hydrilla* stem)
5. Stomatal types using epidermal peels.
6. Structure of anther and microsporogenesis using permanent slides.
7. Structure of pollen grains using whole mounts – *Hibiscus, Acacia* and Grass).
8. Pollen viability test using Evans Blue – *Hibiscus*
9. Study of ovule types and developmental stages of embryo sac.
10. Structure of endosperm (nuclear and cellular); Developmental stages of dicot and monocot embryos using permanent slides.

Practical Model Paper

Time: 3 hrs Max. marks: 50

1. Identify the given material "A", Prepare a double stained permanent mount of transverse section of given the given material. 15M
2. Prepare a temporary mount of epidermal peel of the given leaf material " B " and identify the stomatal type . 7M
3. Conduct the pollen viability test "C" (OR) Isolate the embryo from the given material . 6M
4. Identify and describe the specimens / slides with well labeled diagrams

   (a) Embryology – D (b) Palynology – E (c) Anatomy – F 3 X 4 = 12M
5. Record 5M
6. Viva 5M

B.Sc. Botany
II Year: Semester-III
Skill Enhancement Course

SEC-2 (Credits - 2)

Biofertilizers and Organic Farming (30h)

UNIT - I: (15h)

1. Manures and Biofertilizers. Types of fertilizers, manures. Manure composition. Manures for crop productivity.
2. Differences between fertilizers and biofertilizers. pH changes and water contamination.
3. Bacterial Biofertilizers. General account on the microbes used as biofertilizer.
4. Algal Biofertilizers. Associative effect of different microorganisms. *Azolla* and *Anabaena-azollae* association; nitrogen fixation, factors affecting growth. *Azolla* in rice cultivation.

UNIT - II: (15h)

5. Fungal Biofertilizers. Mycorrhizal association, types of mycorrhizal association, occurrence and distribution, phosphorus nutrition, growth and yield, colonization of VAM – isolation and inoculum production of VAM, and its influence on growth and yield of crop plants.
6. Organic Farming. Green manuring and organic fertilizers. Recycling of bio-degradable municipal, agricultural and industrial wastes. Biocompost making- types, method of vermicomposting. Panchakavya. Biological pest control (neem).

Suggested Readings

1. Dubey R.C. 2005. A Text book of Biotechnology. S Chand & Co. New Delhi.
2. Kumaresan V. 2005. Biotechnology. Saras Publications. New Delhi.
3. John Jothi Prakash E. 2004. Outlines of Plant Biotechnology. Emkay Publication. New Delhi.
4. Sathe T.V. 2004. Vermiculture and Organic Farming. Daya Publishers. New Delhi.
5. Subha Rao N.S. 2000. Soil Microbiology, Oxford & IBH Publishers. New Delhi.
6. Vayas S.C., Vayas S. and Modi H.A. 1998 Bio-fertilizers and organic Farming Akta Prakashan. Nadiad.

B.Sc. BOTANY
II YEAR: Semester-IV

Paper IV: Cell Biology, Genetics and Plant Physiology

DSC-1D **Credits-4**

Theory Syllabus (60 hours)

UNIT I: (15h)

1. Plant cell envelops: Ultra structure of cell wall, Models of membrane structure, structure and functions of Semi permeable Plasma membrane.
2. Cell Organelles: Structure and semiautonomous nature of Mitochondria and Chloroplast.
3. Nucleus: Ultra structure, types and functions of DNA & RNA. Mitochondrial DNA & Plastid DNA and Plasmids.
4. Chromosomes: Morphology, organization of DNA in a chromosome, Euchromatin and Heterochromatin, Karyotype. Special types of chromosomes: Lampbrush and Polytene chromosomes.
5. Cell division: Cell and its regulation; mitosis, meiosis and their significance

UNIT – II: (15 hours)

6. Mendelism: History, Principles of inheritance, Chromosome theory of inheritance, Autosomes and sex chromosomes. Incomplete dominance and Co-dominance. Multiple alleles, Lethal alleles. Epistasis, Recessive and Dominant traits, Polygenic inheritance.
7. Linkage and crossing over, Recombination frequency, two factor and three factor crosses: Interference and coincidence. Numericals based on gene mapping; Sex Linkage.
8. Variation in chromosome number and structure: Deletion, Duplication, Inversion, Translocation, Position effect, Euploidy and Aneuploidy
9. Gene mutations: Types of mutations; Molecular basis of Mutations; Mutagens-physical and chemical (Base analogs, deaminating, alkylating and intercalating agents);

Unit-III (15h)

10. Plant -water Relations: Water potential, osmosis, osmotic and pressure potential, absorption and transport of water.
11. Mineral Nutrition: Essential micro & macro nutrients and symptoms of mineral deficiency.
12. Transpiration: Stomatal structure and movement.
13. Mechanism of phloem transport.
14. Enzymes: Nomenclature, properties, Classification and factors regulating enzyme activity.

UNIT- IV (15h)

15. Photosynthesis: Photosynthetic pigments, Cyclic and Non-cyclic Photophosphorylation. Carbon assimilation pathways: C3, C4 and CAM.
16. Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle and oxidative phosphorylation.
17. Nitrogen Metabolism: Biological nitrogen fixation.
18. Physiological role of Phytohormones: Auxins, gibberellins, cytokinins, ABA, ethylene and Brassinosteroids

12 ***

Reference:

1. Sharma, A. K. and A. Sharma. 1999. Plant Chromosomes: Analysis, Manipulation and Engineering. Harward Academic Publishers, Australia.
2. Shukla, R. S. and P. S. Chandel. 2007. Cytogenetics, Evolution, Biostatistics and Plant Breeding. S.Chand & Company Ltd., New Delhi
3. Verma, P. S. and V. K. Agrawal. 2004. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand & Company Ltd., New Delhi. I. Hopkins, W. G. 1995. Introduction to Plant Physiology. John Wiley & Sons Inc., New York, USA
5. Gardner, E.J., Simmons, M.J., Snustad, D.P. (1991). Principles of Genetics. John Wiley & sons, India. 8th edition.
6. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics, John Wiley & Sons Inc., India. 5th edition.
7. Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. Benjamin Cummings, U.S.A. 10th edition.
8. Griffiths, A.J.F., Wessler, S.R., Carroll, S.B., Doebley, J. (2010). Introduction to Genetic Analysis. W. H. Freeman and Co., U.S.A. 10th edition.
9. Watson J.D., Baker, T.A., Bell, S.P., Gann, A., Levine, M., Losick, R. (2007). Molecular Biology of the Gene, Pearson Benjamin Cummings, CSHL Press, New York, U.S.A. 6th edition.
10. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons Inc., U.S.A. 5th edition.
11. Klug, W.S., Cummings, M.R., Spencer, C.A. (2009). Concepts of Genetics. Benjamin Cummings. U.S.A. 9th edition.
12. Russell, P. J. (2010). iGenetics- A Molecular Approach. Benjamin Cummings, U.S.A. 3rd edition.
13. Griffiths, A.J.F., Wessler, S.R., Carroll, S.B., Doebley, J. (2010). Introduction to Genetic Analysis. W. H. Freeman and Co., U.S.A. 10th edition.
14. Jain, J.L., S. Jain and Nitin Jain. 2008. Fundamentals of Biochemistry. S. Chand & Company Ltd., New Delhi.
15. Pandey, B. P. 2007. Botany for Degree Students: Plant Physiology, Biochemistry, Biotechnology, Ecology and Utilization of Plants. S. Chand & Company Ltd., New Delhi.
16. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc.,USA.
17. Taiz, L. and E. Zeiger. 1998. Plant Physiology (2nd Ed.). Sinauer Associates, Inc., Publishers, Massachusetts, USA.
18. Dutta A.C. 2016. Botany for Degree Students. Oxford University Press.

B.Sc. BOTANY
II YEAR: Semester-IV

Paper IV: Cell Biology, Genetics and Plant Physiology

DSC-1D — Credits-1

Practical Syllabus

(60 hours)

1. Demonstration of cytochemical methods. Fixation of plant material and nuclear staining for mitotic and meiotic studies
2. Study of various stages of mitosis using cytological preparation of Onion root tips
3. Study of ultra structure of cell organelles using photographs Chloroplast, Mitochondria, Nucleus.
4. Study of Special types of Chromosomes (Polytene chromosome and Lampbrush chromosomes-Permanent slide)
5. Mendel's laws through seed ratios. Laboratory exercises in probability and chi-square analysis
6. Chromosome mapping using test cross data.
7. Incomplete dominance and gene interaction through seed ratios (9:7, 9:6:1, 13:3, 15:1, 12:3:1, 9:3:4)
8. Determination of osmotic potential of vascular sap by Plasmolytic method using leaves of *Rheodiscolor / Tradescantia*.
9. Determination of rate of transpiration using Cobalt chloride method
10. Determination of stomatal frequency using leaf epidermal peelings / impressions
11. Determination of amylase activity using potato tubers by titration method
12. Separation of chloroplast pigments using paper chromatography technique
13. Estimation of protein by Biurette method
14. Mineral deficiency symptoms of Micro and Macro nutrients

Practical Model Question Paper

Time: 3 hrs — Max. marks: 50

1. Prepare a cytological slide of given material "A" and identify & describe any two stages with well labeled diagrams. (12M)
2. Genetics problem (10M)
3. Physiology Experiment (12M)
4. Identify and Comment on A & B (2x3 =6M)
   - A. Micronutrient / Macronutrients Deficiency symptoms
   - B. Cell organelles / Special type of Chromosomes
5. Record (5M)
6. Viva (5M)

B.Sc. BOTANY

III Year: Semester-V

Paper-1A: Biodiversity & Conservation

DSE-1A **Credits-4**

Theory Syllabus (60 hours)

Unit - I: (15h)

1. Plant diversity and its scope: Genetic diversity, Species diversity, Plant diversity at the ecosystem level, Agrobiodiversity and cultivated plant taxa, wild taxa.
2. Values and uses of Biodiversity: Ethical and aesthetic values, Precautionary principle, Methodologies for valuation, Uses of plants, Uses of microbes.

Unit-II: (15h)

3. Loss of Biodiversity: Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agrobiodiversity, Projected scenario for biodiversity loss.
4. Management of Plant Biodiversity: Organizations associated with biodiversity, management-Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR.
5. Biodiversity legislation and conservation, Biodiversity information management and communication.

Unit-III: (15h)

6. Conservation of Biodiversity: Conservation of genetic diversity, species diversity and ecosystem Diversity
7. Principles of conservation - *Insitu* and *Exsitu* conservation. Sacred groove, Botanical garden, Biosphere reserves, Sanctuaries, National parks (*Insitu*) and Tissue culture, Gene / seed / pollen banks and Cryopreservation (*Exsitu*).

Unit-IV: (15h)

8. Role of plants in relation to Human Welfare; Importance of forestry their utilization and commercial aspects, Avenue trees, Ornamental plants of India.
9. Alcoholic beverages through ages. Fruits and nuts, Important fruit crops and their commercial importance. Wood and its uses.

References:

1. Krishnamurthy, K.V. (2004). An Advanced Text Book of Biodiversity - Principles and Practices. Oxford and IBH Publications Co. Pvt. Ltd. New Delhi
2. Bharucha, E. 2005. Textbook of Environmental Studies for Undergraduate Courses. Universities Press (India) Private Limited, Hyderabad.
3. Odum, E. P. 1983. Basics of Ecology. Saunder's International Students Edition, Philadelphia.
4. Sharma, P. D. 1989. Elements of Ecology. Rastogi Publications, Meerut.

B.Sc. BOTANY

III Year: Semester-V

Paper-IA: Biodiversity & Conservation

DSE-IA **Credits-I**

Practical Syllabus (30 hours)

1. Study on local biodiversity: Herbs, shrubs and trees, Seasonal, Annual, biennial and perennial plants.
2. Study of morphological characteristics of plant communities: Hydrophytes (*Eichhornia, Hydrilla, Pistia, Nymphaea, Vallisneria*), Xerophytes: (*Asparagus, Opuntia, Euphorbia milii, Casuarina, Calotropis*)
3. Assessment of biodiversity
   i) Avenue trees: *Pongamia pinnata, Butea monosperma, Spathodea* sp., *Delonix regia, Jacaranda mamosifolia, Cassia fistula, Mimusops elengi, Acacia leucophloea,* and *Albizia lebbeck.*
   ii) Ornamental Plants: Any five locally available ornamental plants.
   iii) Timber Value: *Acacia nilotica, Tectona grandis* and *Azardirachta indica*
   iv) Fruits: *Mangyfera indica* (Mango), *Ziziphus mauritiana, Psidium guajava* (Guava), *Annona squamosa*
   v) Nuts: *Anacardium occidentale* (Cashew), *Terminalia catappa* (Badam)
   vi) Beverages: *Madhuca indica, Camellia sinensis* (Tea),*Coffea arabica* (Coffee), *Borassus flabellifer* (Toddy palm) and *Caryota urens*
   vii) Medicinal value: *Catharanthus roseus, Tinospora cordifolia* and *Phyllanthus emblica, Ocimum sp* , and *Azardirachta indica*
4. Field trip: Collection of plants from the field, identification and preparation of Herbarium.

Practical Model Question Paper — 3 Hours

50 Marks

1. Identify and describe Biodiversity value of a) Medicinal b) Timber c) Fruit.	3x4=12M
2. Any two available ornamental plants and their uses.	2x3=06M
3. Comment on the specimens A, B & C	3x3=09M
4. Identify and describe Biodiversity value of the given slides D & E (Hydrophytes & Xerophytes)	2x4=08M
5. Field trip Herbarium.	05M
6. Record	05M
7. Viva	05M

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B.Sc. BOTANY

III Year: Semester-VI

Paper-1B: Tissue Culture and Biotechnology

DSE-1B **Credits-4**

Theory Syllabus (60 hours)

UNIT – I: (15 hours)

1. Tissue culture: Introduction, sterilization procedures, explants, culture media - composition and preparation; Nutrient and hormone requirements, Micropropagation.
2. Organ culture: Totipotency, Vegetative Organs-Root, Shoot, Leaf culture
   Reproductive Organs-Anther, Ovule, Embryo culture
3. Callus culture and isolation and fusion of protoplast culture
4. Organogenesis, Embryogenesis (somatic and zygotic).

UNIT- II: (15 hours)

5. Applications of tissue culture: Production of pathogen free plants and stress resistant plants, somaclonal variants and synthetic seeds.
6. Induction of hairy roots and its applications in production of secondary metabolites.
7. Haploidy and triploids, Cryopreservation and Germplasm Conservation.
8. Somatic hybrids and Cybrids.

UNIT- III: (15 hours)

9. Biotechnology: Introduction, history, scope and applications.
10. rDNA technology: Basic aspect of gene cloning. Enzymes used in gene cloning-Restriction enzymes, Ligases, Polymerases.
11. Gene cloning: Recombinant DNA, Bacterial Transformation and selection of recombinant clones, vectors- cloning vehicles (Plasmid, Cosmids, Bacteriophages, & Phasmids; Eukaryotic Vectors (YAC) Gene Construct; Applications of rDNA technology.

UNIT - IV: (15 hours)

12. Gene Libraries: construction of genomic and cDNA libraries, colony hybridization; Probes-oligonucleotide, Polymerase Chain Reaction (PCR) and its applications.
13. Methods of gene transfer- Agrobacterium-mediated, Direct gene transfer by Electroporation, Microinjection, Microprojectile bombardment; Selection of transgenics-selectable marker and reporter genes.
14. Application of transgenics in improvement of crop productivity and quality traits. Pest resistant transgenic crops (Bt-cotton & Bt-brinjal); herbicide resistant plants (Roundup Ready soybean); crops with quality traits (Flavr Savr tomato, Golden rice).

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References:

1. Balasubramanian, D., C. F. A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman. 2004.
2. Biotechnology. Universities Press (India) Private Limited, Hyderabad.
3. Channarayappa. 2007. Molecular Biotechnology – Principles and Practices. Universities Press (India) Private Limited, Hyderabad.
4. Chawala, H. S. 2002. Introduction to Plant Biotechnology. Oxford & IBH Publishing Company, New Delhi.
5. Dubey, R. C. 2001. A Textbook of Biotechnology. S. Chand & Company Ltd., New Delhi
6. Edmond, J. B., T. L. Senn, F. S. Adrews and R. J. Halfacre. 1977.
7. Jha, T.B. and B. Ghosh. 2005. Plant Tissue Culture – Basic and Applied. Universities Press (India). Private Limited, Hyderabad..
8. Ramawat, K. G. 2008. Plant Biotechnology. S. Chand & Company Ltd., New Delhi.
9. Salisbury, F. B. and C. W. Ross. 1992. Plant Physiology. 4th edn. (India Edition), Wordsworth, Thomson Learning Inc., USA.
10. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice. Elsevier Science Amsterdam. The Netherlands.
12. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications of recombinant DNA. ASM Press, Washington.
13. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms. Vikas Publication House Pvt. Ltd., New Delhi. 5th edition.
14. Snustad, D.P. and Simmons, M.J. (2010). Principles of Genetics. John Wiley and Sons, U.K. 5th edition.
15. Stewart, C.N. Jr. (2008). Plant Biotechnology & Genetics: Principles, Techniques and Applications. John Wiley & Sons Inc. U.S.A.

B.Sc. BOTANY

III Year: Semester-VI

Paper-1B: Tissue Culture and Biotechnology

DSE-1B **Credits-1**

Practical Syllabus — 30 Hours

Major Experiments

1. Isolation of plant DNA. (Tomato)
2. Production of synthetic seeds /Encapsulation of embryo
3. Preparation of plant tissue culture medium - MS medium
4. Isolation of protoplasts.

Minor Experiments

1. Callus induction
2. Demonstration of Micropropagation/multiple shoots
3. Anther culture
4. PCR –Demonstration
5. Study of biotechnology products: Samples of antibiotics and vaccines
6. Photographs of Gene transfer methods.
7. Instruments used in Biotechnology lab- Autoclave, Laminar air flow, Hot air oven and Incubator.
8. Demonstration of In-vitro sterilization and inoculation methods using leaf and nodal explants of tobacco, Datura, Brassica etc.

Spotting

1. Study of anther, embryo and endosperm culture, micropropagation, somatic embryogenesis & artificial seeds through photographs.
2. Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene transfer by electroporation, microinjection, microprojectile bombardment.
4. Study of steps of genetic engineering for production of Bt cotton, Golden rice, Flavr Savr tomato through photographs.
5. Restriction digestion and gel electrophoresis of plasmid DNA.

Practical Model Question Paper

3 Hours **Max. Marks: 50**

1. Major Experiment (18 marks)
   Isolation of DNA
   (OR)
   Production of synthetic seeds / Encapsulation of embryo
2. Minor Experiment (10 marks)
   Callus / Micropropagation / Multiple shoots
3. Spotters (3x4=12 marks)
   A. Vaccines
   B. Antibiotics
   C. Gene transfer methods / instruments
4. Record (5 marks)
5. Viva (5 marks)

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B.Com (Computer Applications)
Syllabus (CBCS)
(w.e.f. 2019–2020)

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FACULTY OF COMMERCE
SATAVAHANA UNIVERSITY
KARIMNAGAR - 505002 T.S.

B.COM (Computer Applications)
CBCS COURSE STRUCTURE
w.e.f. 2019-'20

Sl.No.	*Code*	*Course Title*	*HPW*	*Credits*	*Exam Hrs*	*Marks*
(1)	(2)	(3)	(5)	(6)	(7)	(8)
		SEMESTER – I				
1.	ELS1	English (First Language)	4	4		
2.	SLS1	Second Language	4	4		
3.	AECC1	Environmental Science	2	2	1 ½ hrs	40U+10I
4.	DSC101	Financial Accounting–I	5	5	3 hrs	80U+20I
5.	DSC102	Business Organization and Management	5	5	3 hrs	80U+20I
6.	DSC103	Fundamentals of Information Technology	3T+4P	5	1 ½ hrs	50T+35P + 15I
		Total	**27**	**25**		
		SEMESTER – II				
7.	ELS2	English (First Language)	4	4		
8.	SLS2	Second Language	4	4		
9.	AECC2	Basic Computer Skills	2	2	1 ½ hrs	40U+10I
10.	DSC201	Financial Accounting–II	5	5	3 hrs	80U+20I
11.	DSC202	Business Laws	5	5	3 hrs	80U+20I
12.	DSC203	Programming with C & C++	3T+4P	5	1 ½ hrs	50T+35P + 15I
		Total	**27**	**25**		
		SEMESTER – III				
13.	ELS3	English (First Language)	3	3		
14.	SLS3	Second Language	3	3		
15.	SEC1	**a)**Principles of Insurance/ **b)**Foundation of Digital Marketing/ **c)**Fundamentals of Business Analytics	2	2	1 ½ hrs	40U+10I
16.	SEC2	**a)**Practice of Life Insurance/ **b)**Web Design & Analytics/ **c)**Application of Business Analytics	2	2	1 ½ hrs	40U+10I
17.	DSC301	Advanced Accounting	5	5	3 hrs	80U+20I
18.	DSC302	Business Statistics-I	5	5	3 hrs	80U+20I
19.	DSC303	Relational Database Management System	3T+4P	5	1 ½ hrs	50T+35P + 15I
		Total	**27**	**25**		
		SEMESTER – IV				
20.	ELS4	English (First Language)	3	3		
21.	SLS4	Second Language	3	3		
22.	SEC3	**a)**Practice of General Insurance/ **b)**Social Media Marketing **c)**Business Intelligence	2	2	1 ½ hrs	40U+10I
23.	SEC4	**a)**Regulation of Insurance Business/ **b)**Search Engine Optimization & Online Advertising c)Data Visualisation&Storytelling	2	2	1 ½ hrs	40U+10I
24.	DSC401	Income Tax/Excel Foundation	5	5	3 hrs	80U+20I
25.	DSC402	Business Statistics-II	5	5	3 hrs	80U+20I

26.	DSC403	Web Technologies	3T+4P	5	1 ½ hrs	50T+35P+ 15I
		Total	**27**	**25**		
		SEMESTER – V				
27.	ELS5	English (First Language)	3	3		
28.	SLS5	Second Language	3	3		
29.	GE	a)Business Economics / b) Advanced Aspects of Income Tax	4	4	3 hrs	80U+20I
30.	DSE501	**a)** Cost Accounting/ **b)** Financial Planning & Performance/ **c)** InternationalFinancial Reporting-I	5	5	3 hrs	80U+20I
31.	DSE502	**a)** Computerized Accounting/ **b)** Financial Decision Making-I/ **c)** International Tax &Regulation	3T+4P/ 5	5	3 hrs	50T+35P + 15I/ 80U+20I
32.	DSE503	**a)** Management Information Systems/ **b)** Ecommerce/**c)** Mobile Applications	3T+4P	5	1 ½ hrs	50T+35P + 15I
		Total	**29/27**	**25**		
		SEMESTER - VI				
33.	ELS6	English (First Language)	3	3		
34.	SLS6	Second Language	3	3		
35.	PR	Research Methodology and Project Report	2T+4R	4	1 ½ hrs	40U+10I 35R+15VV
36.	DSE601	**a)** Cost Control and Management Accounting/ **b)** Financial control/ **c)** International Financial Reporting-II	5	5	3 hrs	80U+20I
37.	DSE602	**a)** Theory and Practice of GST/ **b)** Financial Decision Making-II / **c)** InternationalAuditing	3T+4P/ 5	5	3 hrs	50T+35P + 15I/ 80U+20I
38.	DSE603	**a)** Multimedia Systems/ **b)** Cyber Security/**c)** Data Analytics	3T+4P	5	1 ½ hrs	50T+35P + 15I
		Total	**31/29**	**25**		
		GRAND TOTAL	**168/164**	**150**		

ELS: English Language Skill**; SLS**: Second Language Skill; **AEC: A**bility **E**nhancement **C**ompulsory **C**ourse; ***SEC: S**kill **E**nhancement **C**ourse; **DSC: D**iscipline **S**pecific **C**ourse; **DSE: D**iscipline **S**pecific **E**lective; **GE: G**eneric **E**lective; **T**: **T**heory; **P**: **P**ractical**; I**: Internal Exam **U: U**niversity Exam: **PR**: **P**roject **R**eport; **VV**: **V**iva-**V**oce Examination.*

Note: If a student should opt for "a" in SEC in III semester, the student has to opt for "a" only in IV semester and so is the case with "b" and "c". In the case of DSE also the rule applies.

SUMMARY OF CREDITS

Sl. No.	Course Category	No. of Courses	Credits Per Course	Credits
1	English Language	6	4/3	20
2	Second Language	6	4/3	20
3	AECC	2	2	4
4	**SEC**	**4**	**2**	**8**
5	**GE**	**1**	**4**	**4**
6	**Project Report**	**1**	**4**	**4**
7	**DSC**	**12**	**5**	**60**
8	**DSE**	**6**	**5**	**30**
	TOTAL	**40**		**150**
	Commerce	**24**		**106**
CREDITS UNDER NON-CGPA		**NSS/NCC/Sports/Extra Curricular**	**Up to 6 (2 in each year)**	
		Summer Internship	**Up to 4 (2 in each after I & II years)**	

Paper DSC 101: FINANCIAL ACCOUNTING - I

Objective: *To acquire conceptual knowledge of basics of accounting and preparation of final accounts of sole trader.*

UNIT-I: ACCOUNTING PROCESS:
Financial Accounting: Introduction – Definition – Evolution – Functions-Advantages and Limitations –Users of Accounting Information- Branches of Accounting – Accounting Principles: Concepts and Conventions- Accounting Standards– Meaning – Importance – List of Accounting Standards issued by ASB -– Accounting System- Types of Accounts – Accounting Cycle- Journal- Ledger and Trial Balance. (Including problems)

UNIT-II: SUBSIDIARY BOOKS:
Meaning –Types - Purchases Book - Purchases Returns Book - Sales Book - - Sales Returns Book - Bills Receivable Book - Bills Payable Book – Cash Book - Single Column, Two Column, Three Column and Petty Cash Book - Journal Proper.(Including problems)

UNIT-III: BANK RECONCILIATION STATEMENT:
Meaning – Need - Reasons for differences between cash book and pass book balances – Favourable and over draft balances – Ascertainment of correct cash book balance (Amended Cash Book) - Preparation of Bank Reconciliation Statement. (Including problems)

UNIT-IV: RECTIFICATION OF ERRORS AND DEPRECIATION:
Capital and Revenue Expenditure – Capital and Revenue Receipts: Meaning and Differences - Differed Revenue Expenditure. Errors and their Rectification: Types of Errors - Suspense Account – Effect of Errors on Profit. (Including problems)

Depreciation (AS-6): Meaning – Causes – Difference between Depreciation, Amortization and Depletion - Objectives of providing for depreciation – Factors affecting depreciation – Accounting Treatment – Methods of depreciation: Straight Line Method - Diminishing Balance Method (Including problems)

UNIT-V: FINAL ACCOUNTS:
Final Accounts of Sole Trader: Meaning -Uses -Preparation of Manufacturing, Trading and Profit & Loss Account and Balance Sheet – Adjustments – Closing Entries.(Including problems)

SUGGESTED READINGS:

1. Accountancy-I: Haneef and Mukherjee, Tata McGraw Hill Company.
2. Principles & Practice of Accounting: R.L.Gupta&V.K.Gupta, Sultan Chand.
3. Accountancy-I: S.P. Jain & K.L Narang, Kalyani Publishers.
4. Accountancy–I: Tulasian, Tata McGraw Hill Co.
5. Introduction to Accountancy: T.S.Grewal, S.Chand and Co.
6. Advanced Accountancy-I: S.N.Maheshwari&V.L.Maheswari, Vikas.
7. Fundamentals of Financial Accounting: Deepak Sehgil, Tax Mann Publication.
8. Financial Accounting: JawaharLal, Himalaya Publishing House.

Paper DSC 102: BUSINESS ORGANISATION AND MANAGEMENT

Objective: *To acquaint the students with the basics of Commerce and Business concepts and functions, forms of Business Organization and functions of Management.*

UNIT-I: INTRODUCTION AND FORMS OF BUSINESS ORGANISATIONS:
Concepts of Business, Trade, Industry and Commerce - Objectives and functions of Business –Social Responsibility of a business - Forms of Business Organization - Meaning, Characteristics, Advantages and Disadvantages of Sole Proprietorship – Meaning, Characteristics, Advantages and Disadvantages of Partnership - Kinds of Partners - Partnership Deed -Concept of Limited liability partnership – Meaning, Characteristics, Advantages and Disadvantages of Hindu Undivided Family – Meaning, Advantages and Disadvantages of Co-Operative Organization.

UNIT-II: JOINT STOCK COMPANY:
Joint Stock Company - Meaning - Definition - Characteristics - Advantages and Disadvantages - Kinds of Companies - Promotion - Stages of Promotion - Promoter - Characteristics - Kinds - Preparation of Important Documents - Memorandum of Association - Clauses - Articles of Association - Contents – Prospectus - Contents – Red herring Prospectus- Statement in lieu of Prospectus (As per Companies Act. 2013).

UNIT-III: INTRODUCTION TO FUNCTIONS OF MANAGEMENT:
Management - Meaning - Characteristics - Functions of Management - Levels of Management – Skills of Management- Scientific Management - Meaning - Definition - Objectives - Criticism – Fayol's 14 Principles of Management .

UNIT-IV: PLANNING AND ORGANISING: Meaning - Definition - Characteristics - Types of Plans - Advantages and Disadvantages – Approaches to Planning - Management by Objectives (MBO) - Steps in MBO - Benefits –Weaknesses—Definition of Organizing-Organization-Process of Organizing - Principles of Organization - Formal and Informal Organizations - Line, Staff Organizations - Line and Staff Conflicts - Functional Organization - Span of Management - Meaning - Determining Span - Factors influencing the Span of Supervision.

UNIT-V: AUTHORITY, COORDINATION AND CONTROL:
Meaning of Authority, Power, responsibility and accountability - Delegation of Authority - Decentralization of Authority - Definition, importance, process, and principles of Coordination-techniques of Effective Coordination - Control - Meaning - Definition – Relationship between planning and control -Steps in Control – Types (post, current and pre-control) - Requirements for effective control.

SUGGESTED READINGS:

1. Business Organization & Management: Sharma Shashi K. Gupta, Kalyani Publishers
2. Business Organisation& Management: Patrick Anthony, Himalaya Publishing House
3. Business Organization & Management: Dr. Manish Gupta, PBP.
4. Organization & Management: R. D. Agarwal, McGraw Hill.
5. Modern Business Organization: S.A. Sherlekar, V.S. Sherlekar, Himalaya Publishing House
6. Business Organization & Management: C.R. Basu, Tata McGraw Hill
7. Business Organization & Management: M.C. Shukla S. Chand,
8. Business Organisation and Management: D.S. Vittal, S. Chand
9. Organizational Behaviour Text & Cases: V.S.P. Rao, Himalaya Publishing House
10. Business Organization & Management: Uma Shekaram, Tata McGraw Hill
11. Business Organization & Management: Niranjan Reddy & Surya Prakash, Vaagdevi publishers
12. Business Organisation and Management, Dr.NeeruVasihth, Tax Mann Publications.
13.

Paper DSC 103: FUNDAMENTALS OF INFORMATION TECHNOLOGY

Hours Per Week: 6 (4T+2P) **Credits**: 5
Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: To understand the basic concepts and terminology of informationtechnology and to identify issues related to informationsecurity.

UNIT-I: INTRODUCTION TO COMPUTERS:
Introduction,Definition,Characteristicsofcomputer,EvolutionofComputer,BlockDiagramOf a computer, Generations of Computer, Classification Of Computers, Applications of Computer, Capabilities and limitations ofcomputer.
Role of I/O devices in a computer system.**Input Units:** Keyboard, Terminals and its types. Pointing Devices, Scanners and its types, Voice Recognition Systems, Vision Input System, Touch Screen, **Output Units:** Monitors and its types. Printers: Impact Printers and its types. Non-Impact Printers and its types, Plotters, types of plotters, Sound cards,Speakers.

UNIT -II: COMPUTER ARITHMETIC & STORAGE FUNDAMENTALS:
Binary,Binary Arithmetic, Number System: Positional & Non Positional, Binary,Octal, Decimal, Hexadecimal, Converting from one number system to another.
Primary Vs Secondary Storage, Data storage & retrieval methods.**Primary Storage:** RAM ROM, PROM, EPROM, EEPROM. **Secondary Storage:** Magnetic Tapes, Magnetic Disks. Cartridge tape, hard disks, Floppy disks Optical Disks, Compact Disks, Zip Drive, Flash Drives.

UNIT-III: SOFTWARE:

Software and its needs, Types of S/W. **System Software**: Operating System, Utility Programs Programming Language: Machine Language, Assembly Language, High Level Language their advantages & disadvantages. **Application S/W** and its types: Word Processing, Spread Sheets Presentation, Graphics, DBMS s/w.

UNIT-IV: OPERATING SYSTEM:
Functions, Measuring System Performance, Assemblers, Compilers and Interpreters.
Batch Processing, Multiprogramming, Multi Tasking, Multiprocessing, Time Sharing, DOS, Windows, Unix/Linux.

UNIT-V: DATA COMMUNICATION:
Data, Communication, Basic Networking Devices, Communication Process, Data Transmission speed, Communication Types(modes), Data Transmission Medias, Modem and its working, characteristics, Typesof Networks, LAN Topologies, Computer Protocols, Concepts relating to networking.

SUGGESTED READINGS:

Computer Fundamentals:P.K.Sinha

Paper AEC2: BASIC COMPUTER SKILLS

Hours Per Week: 2 **Credits**: 2
Exam Hours: 1 ½ **Marks:** 40U+10I

Objective: to impart a basic level understanding of working of a computer and its usage.

UNIT I: UNDERSTANDING OF COMPUTER AND WORD PROCESSING:

Knowing computer: What is Computer, Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), VDU, Keyboard and Mouse, Other input/output Devices, Computer Memory, Concepts of Hardware and Software; Concept of Computing, Data and Information; Applications of IECT; Connecting keyboard, mouse, monitor and printer to CPU and checking power supply.

Operating Computer using GUI Based Operating System: What is an Operating System; Basics of Popular Operating Systems; The User Interface, Using Mouse; Using right Button of the Mouse and Moving Icons on the screen, Use of Common Icons, Status Bar, Using Menu and Menu-selection, Running an Application, Viewing of File, Folders and Directories, Creating and Renaming of files and folders, Opening and closing of different Windows; Using help; Creating Short cuts, Basics of O.S Setup; Common utilities.

Understanding Word Processing: Word Processing Basics; Opening and Closing of documents; Text creation and Manipulation; Formatting of text; Table handling; Spell check, language setting and thesaurus; Printing of word document.

UNIT II: SPREAD SHEET, PRESENTATION SOFTWARE & INTRODUCTION TO INTERNET, WWW AND WEB BROWSERS:

Using Spread Sheet: Basics of Spreadsheet; Manipulation of cells; Formulas and Functions; Editing of Spread Sheet, printing of Spread Sheet.

Basics of presentation software: Creating Presentation; Preparation and Presentation of Slides; Slide Show; Taking printouts of presentation / handouts.

Introduction to Internet, WWW and Web Browsers:

Introduction to Internet: Basic of Computer networks; LAN, WAN; Concept of Internet; Applications of Internet; connecting to internet; What is ISP; Knowing the Internet; Basics of internet connectivity related troubleshooting.

World Wide Web: Search Engines; Understanding URL; Domain name; IP Address; Using e-governance website.

Web Browsing: Software, Communications and collaboration: Basics of electronic mail; Getting an email account; Sending and receiving emails; Accessing sent emails; Using Emails; Document collaboration; Instant Messaging; Netiquettes.

SUGGESTED READINGS:

1. Introduction to Computers, Peter Norton, McGrawHill , 2012.
2. Using Information Technology, Brian K williams, StaceyC.Sawyer, Tata McGrawHill.

Web Resources:

1. https://online.stanford.edu/courses/soe-ycscs101-sp-computer-science-101
2.https://www.extension.harvard.edu/open-learning-initiative/intensive-introduction- computer-science.

Paper DSC 201: FINANCIAL ACCOUNTING-II

Objective: *To acquire accounting knowledge of bills of exchange and other business accountingmethods.*

UNIT-I: BILLS OF EXCHANGE:
Bills of Exchange - Definition- Distinction between Promissory note and Bills of exchange- Accounting treatment of Trade bills: Books of Drawer and Acceptor- Honour and Dishonour of Bills- Renewal of bills- Retiring of bills under rebate- Accommodation bills.(Including problems)

UNIT-II: CONSIGNMENT ACCOUNTS:
Consignment – Meaning – Features– Proforma invoice - Account sales – Del crederecommission-Accounting treatment in the books of the consignor and the consignee - Valuation of consignment stock –Treatment of Normal and abnormal Loss - Invoice of goods at a price higher than the cost price. (Including problems)

UNIT-III: JOINT VENTURE ACCOUNTS:
Joint Venture – Meaning –Features-Difference between Joint Venture and Consignment-Accounting Procedure-Methods of Keeping Records for Joint Venture Accounts-Method of Recording in co-ventures books-Separate Set of Books Method- Joint Bank Account-Memorandum Joint Venture Account (Including problems)

UNIT-IV: ACCOUNTS FROM INCOMPLETE RECORDS:
Single Entry System – Meaning -Features–Difference between Single Entry and Double Entry systems -Defects in Single Entry System - Books and accounts maintained - Ascertainment of Profit - Statement of Affairs and Conversion method (Including problems)

UNIT-V: ACCOUNTING FOR NON-PROFIT ORGANIZATIONS:
Non- Profit Organization – Meaning – Features – Receipts and Payments Account – Income and Expenditure Account – Balance Sheet(Including problems)

SUGGESTED READINGS:

1. Accountancy-I: Haneef and Mukherjee, Tata McGraw Hill Co.
2. Principles and Practice of Accounting: R.L. Gupta & V.K. Gupta,Sultan Chand & Sons.
3. Accountancy–I: Tulasian, Tata McGraw Hill Co.
4. Accountancy–I: S.P. Jain & K.L Narang, Kalyani.
5. Advanced Accountancy-I: S.N.Maheshwari&V.L.Maheswari, Vikas.
6. Advanced Accountancy: M Shrinivas& K Sreelatha Reddy, Himalaya Publishers.
7. Financial Accounting: M.N Arora, Tax Mann Publications.

Paper DSC 202: BUSINESS LAWS

Objective: *To understand basics of contract act, sales of goods act, IPRs and legal provisions applicable for establishment, management and winding up of companies in India.*

UNIT–I: INDIAN CONTRACT ACT:

Agreement and contract - Essentials of a valid contract - Types of contracts - Offer and Acceptance - Essentials of valid offer and acceptance - Communication and revocation of offer and acceptance – Consideration definition - Essentials of valid consideration -Modes of Discharge of a contract - Performance of Contracts - Breach of Contract - Remedies for Breach - Significance of Information Technology Act.

UNIT–II: SALE OF GOODS ACT AND CONSUMER PROTECTION ACT:

Contract of Sale: Essentials of Valid Sale - Sale and Agreement to Sell – Definition and Types of Goods - Conditions and Warranties - Caveat Emptor - Exceptions - - Unpaid Seller - Rights of Unpaid Seller. Consumer Protection Act 1986: Definitions of Consumer – Person – Goods - Service -Consumer Dispute - Consumer Protection Councils - Consumer Dispute Redressal Agencies - Appeals.

UNIT–III: INTELLECTUAL PROPERTY RIGHTS:

Trade Marks: Definition - Registration of Trade Marks - Patents: Definition - Kinds of Patents - Transfer of the Patent Rights - Rights of the Patentee - Copy Rights: Definition -- Rights of the Copyright Owner - Terms of Copy Right - Copy Rights Infringement - Other Intellectual Property Rights: Trade Secrets - Geographical Indications.

UNIT–IV: MANAGEMENT OF COMPANIES AND MEETINGS:

Director: Qualification - Disqualification - Position - Appointment - Removal – Duties and Liabilities – Loans – Remuneration – Managing Director – Corporate Social Responsibility – Corporate Governance. Meeting: Meaning – Requisites - Notice – Proxy - Agenda – Quorum – Resolutions – Minutes – Kinds – Shareholder Meetings - Statutory Meeting - Annual General Body Meeting – Extraordinary General Body Meeting – Board Meetings.

UNIT–V: WINDING UP:

Meaning – Modes of Winding Up –Winding Up by tribunal – Voluntary Winding Up – Compulsory Winding Up – Consequences of Winding Up – Removal of name of the company from Registrar of Companies – Insolvency and Bankruptcy code - 2016.

SUGGESTED READINGS:

1) Company Law: ND Kapoor, Sultan Chand and Co.
2) Company Law: Rajashree. – HPH
3) Business Law - Kavitha Krishna, Himalaya Publishing House
4) Business Laws – Dr. B. K. Hussain, Nagalakshmi - PBP
5) Company Law: Prof. G. Krishna Murthy, G. Kavitha, PBP
6) Company Law and Practice: GK Kapoor& Sanjay Dhamija, Taxmann Publication.
7) Company Law: Revised as per Companies Act- 2013: KC Garg et al, Kalyani Publication.
8) Corporate Law: PPS Gogna, S Chand.
9) Business Law: D.S. Vital, S Chand
10) Company Law: Bagrial AK, Vikas Publishing House.

Paper DSC 203:PROGRAMMING WITH C & C++

Hours Per Week: 7 (3T+4P) Credits: 5
Exam Hours: 1 ½ Marks: 50U+35P+15I

Objective:To understand the fundamental concepts of programming in C and Object Oriented Programming using C++.

UNIT-I: **INTRODUCTION TO C LANGUAGE, VARIABLES, DATA TYPES AND OPERATORS**

Introduction: Types of Languages- History of C language – Basic Structure –Programming Rules – Flow charts-algorithms–Commonly used library functions - Executing the C Program - Pre-processors in "C"- Keywords & Identifiers – Constants – **Variables:** Rules for defining variables - Scope and Life of a Variable–- **Data types** - Type Conversion - Formatted Input and Output operations. **Operators:** Introduction – Arithmetic – Relational – Logical – Assignment - Conditional - Special - Bitwise - Increment / Decrement operator.

UNIT-II: WORKING WITH CONTROL STATEMENTS, LOOPS

Conditional statements: Introduction - If statements - If-else statements – nested if-else – break statement-continue statement-go to statement-Switch statements. **Looping statements:** Introduction-While statements – Do-while statements - For Statements-nested loop statements.

UNIT-III: FUNCTIONS, ARRAYS AND STRINGS

Functions: Definition and declaration of functions- Function proto type-return statement- types of functions-formatted and unformatted functions. **Built in functions:** Mathematical functions - String functions - Character functions - Date functions.**User defined functions:** Introduction - Need for user defined functions - Elements of functions – Function call – call by value and call by reference - Recursive functions.**Arrays:** Introduction - Defining an array - Initializing an array –characteristics of an array- One dimensional array – Two dimensional array – Multi dimensional array. **Strings:** Introduction - Declaring and initializing string - Reading and Writing strings - String standard functions.

UNIT-IV: POINTERS, STRUCTURES AND UNIONS

Pointers: Features of pointers- Declaration of Pointers-arithmetic operations with pointers

Structures: Features of Structures - Declaring and initialization of Structures –Structure within Structure-Array of Structures- Enumerated data type-**Unions**-Definition and advantages of Unions comparison between Structure & Unions.

UNIT-V: OBJECT ORIENTED CONCEPTS USING C++

Object Oriented Programming: Introduction to Object Oriented Programming - Structure of C++ – Simple programof C++– Storage Classes-Similarities and Differences between C & C++ - Data Members-Member Functions - Object Oriented Concepts-Class-Object-Inheritance-Polymorphism-Encapsulation-Abstraction.

SUGGESTED READINGS:

1. Programming with C& C++ :IndrakantiSekhar, V.V.R.Raman&V.N.Battu, Himalaya Publishers.
2. Programming in ANSI C: Balagurusamy, McGraw Hill.
3. Mastering C: K.R. Venugopal, McGraw Hill.
4. C: The Complete Reference: H.Schildt, McGraw Hill.
5. Let Us C: Y.Kanetkar, BPB.
6. Objected Oriented Programming with C++: E. Balagurusamy, McGraw Hill.
7. Mastering C++: KR.Venugopal&R.Buyya, McGraw Hill.
8. Schaum‟s Outlines: Programming with C++: by John R Hubbard.
9. Let Us C++: Y.Kanetkar, BPB.

Paper SEC1 (a): PRINCIPLES OF INSURANCE

Objective:*To make students to learn the Principles of Insurance.*

UNIT I: RISK MANAGEMENT AND INSURANCE & INSURANCE TERMINOLOGY:
Risk Management –Types of Risks – Actual and Consequential Losses – Management of Risks – Different Classes of Insurance – Importance of Insurance – Management of Risk by Individuals and Insurers – Fixing of Premiums – Reinsurance– Role of Insurance in Economic Development and Social Security – Constituents of Insurance Market – Operations of Insurance Companies – Operations of Intermediaries – Specialist Insurance Companies – Role of Regulators – Common and specific terms in Life and Non Life Insurance - Understanding Insurance Customers – Customer Behavior at Purchase Point – Customer Behavior when Claim Occurs – Importance of Ethical Behavior.

UNIT II: INSURANCE CONTRACT AND INSURANCE PRODUCTS:
Insurance Contract Terms – Principles of Insurance: Principle of Insurable Interest, Principle of Indemnity, Principle of Subrogation, Principle of Contribution, Relevant Information Disclosure, Principle of utmost Good Faith, Relevance of Proximate Cause - Life Insurance Products: Risk of Dying Early – Risk of Living too Long – Products offered – Term Plans – Pure Endowment Plans – Combinations of Plans – Traditional Products – Linked Policies – Features of Annuities and Group Policies - General Insurance Products: Risks faced by Owner of Assets – Exposure to Perils – Features of Products Covering Fire and Allied Perils – Products covering Marine and Transit Risks – Products covering Financial Losses due to Accidents – Products covering Financial Losses due to Hospitalization – Products Covering Miscellaneous Risks.

SUGGESTED READINGS:

1. Principles of Insurance : A Publication of the Insurance Institute of India
2. Principles of Insurance : Telugu Academy, Hyderabad
3. Guide to Risk Management : SagarSanyal
4. Principles of Insurance : Dr V Padmavathi,Dr V Jayalakshmi - PBP
5. Insurance and Risk Management : P.K. Gupta
6. Insurance Theory and Practice : Tripathi PHI
7. Principles of Insurance Management: Neelam C Gulati, Excel Books
8. Life and Health Insurance : Black, JR KENNETH & Harold Skipper, Pearson
9. Principles of Risk Management and Insurance: George E Rejda (13th Edition)
10. Risk Management and Insurance : Trieschman ,Gustavson and Hoyt . South Western College Publishing, Cincinnati, Ohio

Suggested Websites:

1) www.irda.gov.in**2)** www.polocyholder.gov.in**3)** www.irdaindia.org.in

Paper SEC1 (b): FOUNDATION OF DIGITAL MARKETING

Objective:*To make students to learn Foundation of digital marketing.*

UNIT I:DIGITAL MARKETING FOUNDATIONS:

Digital Marketing Strategy – Exploring Digital Marketing – Starting with the Website – Foundations of Analytics – Search Engine Optimization – Search and Display Marketing – Social Media Marketing – Video Marketing.

UNIT II: OPTIMIZING MARKETING EMAILS, MOBILE MARKETING FOUNDATIONS AND CONTENT MARKETING FOUNDATIONS:

Email marketing tools and setup – Email marketing segmentation, personalization and mobile friendly design – Content marketing foundations – Blogs for content marketing – Content marketing for staying relevant – Newsletters for content marketing – Mobile marketing foundations.

SUGGESTED READINGS:

1. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns by Ian Dodson, Wiley
2. Fundamentals of Digital Marketing by Puneet Singh Bhatia, Pearson
3. Foundations of Digital Marketing: Dr. K.V. NAgaraj.KUsha Rani - PBP
4. Digital Marketing by VandanaAhuja, Oxford
5. Digital Marketing by Seema Gupta, McGraw Hill
6. Digital Marketing For Dummies by Ryan Deiss and Russ Henneberry

Paper SEC1 (c) FUNDAMENTALS OF BUSINESS ANALYTICS

Objective:*To make students to understand the Fundamentals of Business Analytics.*

UNIT I: USING DATA TO DRIVE BUSINESS DECISIONS:

Need for data-driven decision making: Solving the business problem using Analytics - Overview of the Business Analytics cycle - Hierarchy of information user -The complete Business Analytics professional: Understanding Business Analyst roles and responsibilities - Identify the Popular Business Analytics Tools.

UNIT II: DATA ANALYTICS USING EXCEL:

Basics of Excel: Organizing data with Excel - Performing simple computations and aggregations using Excel - Working with Summing and other Reporting functions in Excel - Working with pivot tables and charts - Using Excel for Data Analytics: Power Query - Power Pivot - Power view - Power Map - Building tips - Display tips - Keyboard shortcuts - Mouse shortcuts - Standardized layouts - Understanding table based and spreadsheet-based layouts - Best practices - Setting data rules and Cleaning data - Format as table - Data cleansing techniques using External Data - Searching and Combining Data with Power Query: Getting started with Power Query - Know the Environment tabs and toolbars - Access new or existing reports - Importing and combining data from databases, web, files - Splitting and aggregating data - Query data from SQL - Working in the Select Part of an SQL Query - Managing SQL commands - Managing Tables - Discovering and Analyzing Data with Power Pivot: Database concepts - Loading Data into Power Pivot - Using Power Query and Power map add-ins - Designing Pivot Table reports - Filtering data - Creating Custom functions and formulas - Formatting Pivot Tables - Managing Power Pivot Data - Setting Connection properties - Managing Data sources - Configuring Pivot Table Options

SUGGESTED READINGS:

1. Fundamentals of Business Analytics, 2nd Edition; R N Prasad; Wiley
2. Business Analysis with Microsoft Excel and Power BI, 5th edition; Conrad G. Carlberg; Pearson
3. Monetizing Your Data: A Guide to Turning Data into Profit-Driving Strategies and Solutions; Andrew Roman Wells, Kathy Williams Chiang; Wiley
4. Excel Data Analysis: Your visual blueprint for creating and analyzing data, charts and PivotTables, 3rd Edition; Denise Etheridge; Wiley
5. Microsoft Excel 2019 Formulas and Functions (Business Skills), 1st Edition; Paul McFedries; Microsoft
6. Excel Statistics: A Quick Guide, 3rd edition; Neil J. Salkind; Sage Publications
7. Microsoft Excel 2019: For Beginners; J. Davidson
8. Microsoft Excel 2019: Learn Excel Basics with Quick Examples; James Jackson

Paper SEC2 (a): PRACTICE OF LIFE INSURANCE

Objectives: *To make students to learn Practice of Life Insurance.*

UNIT-I: INTRODUCTION TO LIFE INSURANCE AND TYPES OF LIFE INSURANCE POLICIES AND PREMIUM CALCULATION: Meaning evolution, growth and principles of Life Insurance –Life Insurance Organizations in India – Competition and Regulation of Life Insurance - Types of Life Insurance Policies – Term, Whole Life, Endowment, Unit Linked and with or without Profit Policies – Customer Evaluation – Policy Evaluation – Group and Pension Insurance Policies – Special features of Group Insurance/Super Annuation Schemes – Group Gratuity Schemes. Computation of Premiums - Meaning of Premium, its calculation- Rebates – Mode of Rebates – Large sum assured Rebates – Premium Loading – Rider Premiums – Computation of Benefits – Surrender value – Paid up value.

UNIT-II: SETTLEMENT OF CLAIMS RISK & UNDERWRITTINGS AND FINANCIAL PLANNING & TAX SAVING: Settlement of claims: Intimation Procedure, documents and settlement procedures - Underwriting: The need for underwriting – Guiding principles of Underwriting – Factors affecting Insurability – Methods of Life Classification – Laws affecting Underwriting - Financial Planning and taxation: Savings – Insurance vis-à-vis- Investment in the Units Mutual Funds, Capital Markets – Life Insurance in Individual Financial Planning – Implications in IT treatment.

SUGGESTED READINGS:

1. Practice of Life Insurance: Insurance Institute of India, Mumbai.
2. Insurance and Risk Management: P.K.Gupta, Himalaya Publishing House, Mumbai.
3. Fundamentals of Life Insurance Theories and Applications: Kanika Mishra, Prentice Hall
4. Principles of Life Insurance – Dr. V. Padmavathi, Dr. V. Jayalakshmi - PBP
5. Managing Life Insurance: Kutty, S.K., Prentice Hall of India: New Delhi
6. Life and Health Insurance: Black, Jr. Kenneth and Harold Skipper Jr., Prentice Hall, Inc., England.
7. Life Insurance: Principles and Practice: K.C. Mishra and C.S. Kumar, Cengage Learning, New Delhi.
8. Life Insurance in India: Sadhak, Respose Books, New Delhi.

Paper SEC2 (b): WEB DESIGN AND ANALYTICS

Objective:*To make students to understand the Web Design and Analytics.*

UNIT I:WEB DESIGN AND OPTIMIZING CONVERSION RATES:

Exploring and learning web design – Understanding Conversion rate optimization (CRO) – Setting CRO – Understanding target audience – Pptimization champion

UNIT II: GOOGLE ANALYTICS:

Getting started with Google Analytics – Core concepts – Additional interface features – Using reports – Audience reports – Acquisition reports – Social reports – Behavior reports – Track events – Conversion reports – Additional features

SUGGESTED READINGS:

1. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns by Ian Dodson, Wiley
2. Fundamentals of Digital Marketing by Puneet Singh Bhatia, Pearson
3. Digital Marketing by VandanaAhuja, Oxford
4. Digital Marketing by Seema Gupta, McGraw Hill
5. Digital Marketing For Dummies by Ryan Deiss and Russ Henneberry
6. Don't Make Me Think Revisited: A Common Sense Approach to Web Usability By Steve Krug
7. Web Analytics 2.0 – AvinashKaushik
8. Successful Analytics by Brian Clifton
9. Math and Stats for Web Analytics and Conversion Optimization by Himanshu Sharma

Paper SEC2 (c): APPLICATION OF BUSINESS ANALYTICS

Objective:*To make students to understand the Analytics of Application of Business Analytics..*

UNIT I: STATISTICS USING EXCEL:

Descriptive statistics using Excel: Describe data using charts and basic statistical measures – Histograms - Pareto charts – Boxplots - Treemap and Sunburst charts - Inferential Statistics using Excel: Correlation and Regression - Probability distribution – Sampling techniques – Hypothesis testing

UNIT II: GETTING STARTED WITH R:

Introduction to R and RStudio components: Read datasets into R - Export data from R - Manipulate and Process Data in R - Use functions and packages in R - Demonstrate with a Case Study to perform basic analytics using R

SUGGESTED READINGS:

1. Microsoft Business Intelligence Tools for Excel Analysis; Michael Alexander, Jared Decker, Bernard Wehbe; Wiley
2. Business Analysis with Microsoft Excel and Power BI, 5th edition; Conrad G. Carlberg; Pearson
3. Excel Data Analysis: Your visual blueprint for creating and analyzing data, charts and PivotTables, 3rd Edition; Denise Etheridge; Wiley
4. Microsoft Excel 2019 Formulas and Functions (Business Skills), 1st Edition; Paul McFedries; Microsoft
5. Microsoft Excel Data Analysis for Dummies, 3rd edition; Stephen L. Nelson, E. C. Nelson; Wiley
6. Data Analytics with R; BhartiMotwani; Wiley

Paper DSC 301: ADVANCED ACCOUNTING

Objective: *To acquire accounting knowledge of partnership firms and joint stock companies*

UNIT-I: PARTNERSHIP ACCOUNTS-I:
Meaning – Partnership Deed - Capital Accounts (Fixed and Fluctuating) – Admission of a Partner – Retirement and Death of a Partner (Excluding Joint Life Policy)(Including problems)

UNIT-II: PARTNERSHIP ACCOUNTS–II:
Dissolution of Partnership – Insolvency of a Partner (excluding Insolvency of all partners) – Sale to a Company (Including problems)

UNIT-III: ISSUE OF SHARES, DEBENTURES, UNDERWRITING AND BONUS SHARES:
Issue of Shares at par, premium and discount – Pro-rata allotment – Forfeiture and Re-issue of Shares – Issue of Debentures with Conditions of Redemption – Underwriting: Meaning – Conditions- Bonus Shares: Meaning – SEBI Guidelines for Issue of Bonus Shares – Accounting of Bonus Shares(Including problems)

UNIT-IV: COMPANY FINAL ACCOUNTS AND PROFIT PRIOR TO INCORPORATION:
Companies Act 2013: Structure – General Instructions for preparation of Balance Sheet and Statement of Profit and Loss – Part-I: Form of Balance Sheet – Part-II: Statement of Profit and Loss – Preparation of Final Accounts of Companies - Profits Prior to Incorporation- Accounting treatment. (Including problems)

UNIT-V: VALUATION OF GOODWILL AND SHARES:
Valuation of Goodwill: Need – Methods: Average Profits, Super Profits and Capitalization Methods -Valuation of Shares: Need –Net Assets, Yield and Fair Value Methods. (Including problems)

SUGGESTED READINGS:

1. Principles and Practice of Accounting: R.L. Gupta & V.K. Gupta,Sultan Chand & Sons.
2. Advanced Accountancy: Shukla and Grewal, S.Chand& Co.
3. Advanced Accountancy: R.L.Gupta&Radhaswamy, Sultan Chand & Sons.
4. Advanced Accountancy (Vol-II): S.N.Maheshwari&V.L.Maheswari, Vikas.
5. Advanced Accountancy: Dr. G. Yogeshwaran, Julia Allen - PBP
6. Accountancy–III: Tulasian, Tata McGraw Hill Co.
7. Advanced Accountancy: Arulanandam; Himalaya.
8. Accountancy–III: S.P. Jain & K.L Narang, Kalyani Publishers.
9. Guidance Note on the Revised Schedule VI to the Companies Act, 1956, The Institute of Chartered Accounts of India.
10. Advanced Accounting (IPCC): D. G. Sharma, Tax Mann Publications.

Paper DSC 302: BUSINESS STATISTICS -I

Objective: *to inculcate analytical and computational ability among the students.*

UNIT-I: INTRODUCTION:
Origin and Development of Statistics – Definition - Importance and Scope - Limitations of Statistics - Distrust of Statistics.
Statistical Investigation: Planning of statistical investigation - Census and Sampling methods - Collection of primary and secondary data - Statistical errors and approximation - classification and Tabulation of data - Frequency distribution.

UNIT – II: DIAGRAMMATIC AND GRAPHIC PRESENTATION:
Diagrammatic presentation: One Dimensional and Two Dimensional Diagrams – Pictograms – Cartograms Graphic presentation: Technique of Construction of Graphs - Graphs of Frequency Distribution - Graphs of Time Series or Histograms.

UNIT-III: MEASURES OF CENTRAL TENDENCY:
Introduction –Significance -Arithmetic Mean- Geometric Mean - Harmonic Mean - Mode – Median - Quartiles and Percentiles - Simple and Weighted Averages - Uses and Limitations of different Averages.

UNIT-IV: MEASURES OF DISPERSION, SKEWNESS AND KURTOSIS:
Measures of Dispersion: Significance - Characteristics - Absolute and Relative Measures - Range - Quartile Deviation - Mean Deviation- Standard Deviation - Coefficient of Variation.
Measures of Skewness - Karl Pearson's Coefficient of Skewness - Bowley's Coefficient of Skewness - Kelly's Measure of Skewness – Kurtosis: Mesokurtosis, Platy kurtosis and Leptokurtosis.

UNIT-V: CORRELATION:
Meaning -Types - Correlation and Causation – Methods: Scatter Diagram - Karl Person's Coefficient of Correlation - Probable Error and Interpretation of Coefficient of Correlation - Rank Correlation - Concurrent Deviation Method.

SUGGESTED READINGS:

1. Statistics for Management: Levin & Rubin, Pearson
2. Fundamentals of Statistics: Gupta S.C, Himalaya
3. Statistics: E. Narayanan Nadar, PHI Learning
4. Business Statstics –I: Dr. Obul Reddy, Dr. D. Shridevi - PBP
5. Business Statistics: Dr. J. K. Thukral, Taxmann Publications
6. Business Statistics: K. Alagar, Tata McGraw Hill
7. Fundamentals of Statistical: S. P Gupta, Sultan Chand
8. Business Statistics: J. K. Sharma, Vikas Publishers
9. Business Statistics: S. L Aggarwal, S. L. Bhardwaj, Kalyani Publications
10. Statistics-Problems and Solutions: Kapoor V.K, S. Chand
11. Statistics - Theory, Methods and Applications: Sancheti D.C. &Kapoor V.K
12. Business Statistics: S. K. Chakravarty, New Age International Publishers
13. Statistics: Andasn,Sweenly,Williams,Cingage.

Paper DSC 303: RELATIONAL DATABASE MANAGEMENT SYSTEM

Hours Per Week: 7 (3T+4P) **Credits**: 5
Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *to acquire basic conceptual background necessary to design and develop simple database system,Relational database mode, ER model and distributed databases, and to write good queries using a standard query language called SQL.*

UNIT-I: BASIC CONCEPTS: Database Management System - File based system - Advantages ofDBMS over file based system - Database Approach - Logical DBMS Architecture - Three level architecture of DBMS or logical DBMS architecture - Need for three level architecture - Physical DBMS Architecture - Database Administrator (DBA) Functions & Role - Data files indices and Data Dictionary - Types of Database. Relational and ER Models**:** Data Models - Relational Model – Domains - Tuple and Relation - Super keys - Candidate keys - Primary keys and foreign key for the Relations - Relational Constraints - Domain Constraint - Key Constraint - Integrity Constraint - Update Operations and Dealing with Constraint Violations - Relational Operations - Entity Relationship (ER) Model – Entities – Attributes – Relationships - More about Entities and Relationships - Defining Relationship for College Database - E-R Diagram - Conversion of E-R Diagram to Relational Database.

UNIT-II: DATABASE INTEGRITY AND NORMALISATION: Relational Database Integrity - TheKeys - Referential Integrity - Entity Integrity - Redundancy and Associated Problems – Single Valued Dependencies – Normalisation - Rules of Data Normalisation - The First Normal Form -The Second Normal Form - The Third Normal Form - Boyce Codd Normal Form - Attribute Preservation - Lossless-join Decomposition - Dependency Preservation. File Organisation : Physical Database Design Issues - Storage of Database on Hard Disks - File Organisation and Its Types - Heap files (Unordered files) - Sequential File Organisation - Indexed (Indexed Sequential) File Organisation - Hashed File Organisation - Types of Indexes - Index and Tree Structure - Multi-key File Organisation - Need for Multiple Access Paths - Multi-list File Organisation - Inverted File Organisation.

UNIT-III: STRUCTURES QUERY LANGUAGE (SQL): Meaning–SQL commands - DataDefinition Language - Data Manipulation Language - Data Control Language - Transaction Control Language - Queries using Order by – Where - Group by - Nested Queries. Joins – Views – Sequences - Indexes and Synonyms - Table Handling.

UNIT-IV: TRANSACTIONS AND CONCURRENCY MANAGEMENT: Transactions - ConcurrentTransactions - Locking Protocol - Serialisable Schedules - Locks Two Phase Locking (2PL) - Deadlock and its Prevention - Optimistic Concurrency Control. Database Recovery and Security: Database Recovery meaning - Kinds of failures - Failure controlling methods - Database errors - Backup & Recovery Techniques - Security & Integrity - Database Security - Authorization.

UNIT-V: DISTRIBUTED AND CLIENT SERVER DATABASES: Need for Distributed DatabaseSystems - Structure of Distributed Database - Advantages and Disadvantages of DDBMS - Advantages of Data Distribution - Disadvantages of Data Distribution - Data Replication - Data Fragmentation. Client Server Databases: Emergence of Client Server Architecture - Need for Client Server Computing - Structure of Client Server Systems & its advantages.

ADVANCED TOPICS: Overview: Parallel Database - Multimedia Database - Mobile Database - Web Database - Multidimensional Database. Data Warehouse - OLTP Vs OLAP - NoSQL Database.

LAB: SQL QUERIES BASED ON VARIOUS COMMANDS.

SUGGESTED READINGS: 1)Database Systems: R.Elmasri& S.B. Navathe, Pearson.; 2) Introduction to Database Management System: ISRD Group, McGraw Hill.; 3) Database Management System: R.Ramakrishnan&J.Gehrke, McGraw Hill.; 4) Modern Database Management: J.A.Hoffer,V.Rames&H.Topi, Pearson.; 5) Database System Concepts: Silberschatz, Korth&Sudarshan, McGrawHill.6) Simplified Approach to DBMS: ParteekBhaiaKalyani Publishers.7)DatabaseManagement System: NirupmaPathak, Himalaya. 8) Database Management Systems: Pannerselvam, PHI.9) Relational DatabaseManagement System: Srivastava&Srivastava, New Age 10) PHPMySQL Spoken Tutorials by IIT Bombay. 11) OracleDatabase: A Beginner's Guide: I.Abramson, McGraw Hill.

Paper SEC3 (a): PRACTICE OF GENERAL INSURANCE

Objective: *To make the student understand general policies and accounting.*

UNIT I: GENERAL INSURANCE POLICIES:

Introduction to General Insurance-Origin of general insurance—Classification of General Insurance Companies—Indian and International Insurance Market—various roles in Insurance industry—Policy Documents and forms—insurance proposals and forms—General Insurance Products-Fire, Marine, Motor, Liability, Personal Accident and Specialty Insurance, Engineering and other insurance.

UNIT II: UNDERWRITING, PREMIUMS, CLAIMS AND INSURANCE RESERVES AND ACCOUNTING:

Concept of Underwriting—Underwriting Process—Risk sharing and its methods—risk management and steps involved in it—Rating and Premiums—concept of soft and hard markets—Concept of Claim-understanding the process of claim management—claims fraud and fraud prevention—Insurance reserves and accounting—different types of reserves of insurance companies—reserving process followed by insurance companies—Insurance accounting.

SUGGESTED READINGS:

1. Practice of General Insurance – Insurance Institute of India.
2. Practice of General Insurance – D.S. Vittal-HPH.
3. Principles & Practice of Insurance- Dr. P. Periasamy – HPH.
4. Risk Management : A Publication of the Insurance Institute of India.,
5. Practice of General Insurance: Dr. V. Padmavathi, Dr. V. Jayalakshmi, PBP.
6. Insurance Theory and Practice: Tripathi PHI
7. Life and Health Insurance: Black, JR KENNETH & Harold Skipper, Pearson
8. Risk Management and Insurance : Trieschman ,Gustavson and Hoyt
9. South Western College Publishing Cincinnati, Ohio.

Paper SEC3 (b): SOCIAL MEDIA MARKETING

Objective:*To make students to understand the Social Media Marketing.*

UNIT I:SOCIAL MEDIA MARKETING:

Building an online community – Understanding Social Media Marketing – Marketing and building presence on Facebook – Marketing and building presence on Twitter – Employer branding on LinkedIn

UNIT II: ONLINE ADVERTISING ON SOCIAL MEDIA:

Facebook advertising overview – How Facebook ads work – How to create Facebook ads – Additional advertising options and best practices for Facebook advertising – Marketing and monetizing on YouTube – Customize your YouTube Channel – Video optimization on YouTube – YouTube Analytics

SUGGESTED READINGS:

1. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns by Ian Dodson, Wiley
2. Fundamentals of Digital Marketing by Puneet Singh Bhatia, Pearson
3. Digital Marketing by VandanaAhuja, Oxford
4. Tuten: Social Media Marketing, sage
5. Digital Marketing by Seema Gupta, McGraw Hill
6. Social Media Marketing All-In-One for Dummies By Jan Zimmerman and Deborah Ng
7. Facebook Growth Hacking: How to Correctly Set Up and Maintain Your Facebook Presence and Gain Massive Amounts of Fans (Social Media Marketing) by Jeff Abston
8. Youtube Influencer: How To Become a Youtube Influencer, Why Influencer Marketing Matters, and How To Monetize Your Channel by Jeff Abston

Paper SEC-3 (c): BUSINESS INTELLIGENCE

Objective:*To make students to understand the Business Intelligence.*

UNIT I: BUSINESS INTELLIGENCE USING POWER BI:

Getting data in Power BI: Overview of Power BI Desktop - Connect to data sources in Power BI Desktop - Clean and transform data with the Query Editor - advanced data import and cleaning techniques - Cleaning irregularly formatted data - Modeling the data: Manage data relationships – Create calculated columns – Optimizing data models – Create calculated measures – Create calculated tables – Explore time-based data - Exploring data: Introduction to the Power BI service - Turn business intelligence data into data insights

UNIT II: POWER BI AND EXCEL:

Using Excel data in Power BI: Uploading an Excel workbook with a simple table into Power BI - Upload workbooks created with Excel Power Pivot and Power View - Publishing and sharing: Publish Power BI Desktop reports - Print and export dashboards and reports - Manually republish and refresh data - Power BI Mobile - Create groups in Power BI – Publish to web

SUGGESTED READINGS:

1. Introducing Microsoft Power BI; Alberto Ferrari, Marco Russo; Microsoft Press
2. Introduction to Microsoft Power Bi: Bring Your Data to Life; M.O. Cuddley; Createspace Independent Pub
3. Applied Microsoft Power BI: Bring your data to life; TeoLachev; Prologika Press
4. Business Analysis with Microsoft Excel and Power BI, 5th edition; Conrad G. Carlberg; Pearson

Paper SEC4 (a): REGULATION OF INSURANCE BUSINESS

Objective:*To equip the students with the knowledge regarding Insurance Business Regulations*

UNIT I: INSURANCE LEGISLATION IN INDIA:

History of life and non-life insurance legislation—nationalization—insurance reforms—insurance business Act, 1972—IRDA and its functions including licensing functions—Web aggregators—regulation for intermediaries—CCS-SPV-PoS-insurance repositories-TPAs—Role and duties of surveyors—Origin and development of micro-insurance—regulation of ULIPs—pension schemes—money laundering—KYC—methods of receipt of premium—Exchange control regulations relating to General and Life Insurance—IRDA Health Insurance Regulations, 2016—Health plus life combo products.

UNIT II: POLICY HOLDERS RIGHTS OF ASSAINGMENT, NOMINATION AND TRANSFER:

Assignment and transfer of insurance policies—provisions related to nomination—repudiation—Fraud—protection of policyholder interest—stages in insurance policy-presale stage-post sale stage-free look period—grievance redressal—claim settlement—key feature document—dispute resolution mechanism—insurance ombudsman—solvency margin and investments—international trends in insurance regulation.

SUGGESTED READINGS:

1. Regulation of Insurance Business – Insurance Institute of India
2. Regulation of Insurance Business – D.S. Vittal, HPH
3. Regulation of Insurance Business: Dr. V. Padmavathi, PBP
4. Risk Management : A Publication of the Insurance Institute of India
5. Insurance Theory and Practice: Tripathi PHI
6. Life and Health Insurance: Black, JR KENNETH & Harold Skipper, Pearson
7. Risk Management and Insurance : Trieschman ,Gustavson and Hoyt
8. South Western College Publishing Cincinnati, Ohio.
9. Insurance Management – S.C. Sahoo& S.C. Das-HPH.

Paper SEC4 (b): SEARCH ENGINE OPTIMIZATION AND ONLINE ADVERTISING

Objective:*To make students to understand the Search engine optimization and online advertising.*

UNIT I:SEO FOUNDATIONS AND SEO KEYWORD STRATEGY:

Understanding SEO – Keyword strategy – Content optimization – Long-term content planning – Link-building strategies – Measuring SEO effectiveness – SEO for Ecommerce – Local search – Mobile SEO

UNIT II: GOOGLE ADWORDS AND REMARKETING:

Pay-Per-Click Advertising – Getting started with Google Adwords – Advertising tracking – Key Google Adwords strategies – Remarketing with Google – Budget and ROI tips – B2B Remarketing Campaigns

SUGGESTED READINGS:

1. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns by Ian Dodson, Wiley
2. Fundamentals of Digital Marketing by Puneet Singh Bhatia, Pearson
3. Digital Marketing by VandanaAhuja, Oxford
4. Digital Marketing by Seema Gupta, McGraw Hill
5. SEO for Dummies, 6th Edition, by John Kent
6. SEO Fitness Workbook: 2018 Edition: The Seven Steps to Search Engine Optimization Success on Google By Jason McDonald
7. The Art of SEO: Mastering Search Engine Optimization By Eric Enge, Stephan Spencer and Jessie Stricchiola
8. Google Adwords for Beginners: A Do-It-Yourself Guide to PPC Advertising By Cory Rabazinsky, 2015

Paper SEC-4 (c) DATA VISUALIZATION & STORYTELLING

Objective:*To make students to understand the Data visualization & Storytelling.*

UNIT I: DATA VISUALIZATION USING POWER BI:

Visuals in Power BI: Bar charts – Pie charts – Treemaps – Combination charts – Slicers – Map visualizations – Matrixes and Tables – Scatter charts – Waterfall and funnel charts - Gauges and single-number cards - Modifying visuals and reports: Modify colors in charts and visuals – Add shapes, text boxes, and images to reports - Page layout and formatting - Other Data Visualization features and options: Group interactions among multiple visualizations on the same report page - Summarization and category options – Z-order - Visual hierarchies and drill-down

UNIT II: TELLING STORIES WITH DATA:

Data Storytelling: Apply storytelling principles to business analytics - Improve business analytics presentations through storytelling - Creating high-impact reports and presentations: Guidelines and best practices

SUGGESTED READINGS:

1. Introducing Microsoft Power BI; Alberto Ferrari, Marco Russo; Microsoft Press
2. Introduction to Microsoft Power Bi: Bring Your Data to Life; M.O. Cuddley; Createspace Independent Pub
3. Applied Microsoft Power BI: Bring your data to life; TeoLachev; Prologika Press
4. Business Analysis with Microsoft Excel and Power BI, 5th edition; Conrad G. Carlberg; Pearson
5. Microsoft Power BI Dashboards Step by Step, Errin O'Connor, Microsoft Press
6. Storytelling with Data: A Data Visualization Guide for Business Professionals; Cole NussbaumerKnaflic; Wiley

Paper DSC 401: INCOME TAX

Objective: *To acquire conceptual and legal knowledge about Income Tax provisions relating to computation of Income from different heads with reference to an Individual Assessee.*

UNIT–I: INTRODUCTION:

Direct and Indirect Taxes – Canons of Taxation - Features and History of Income Tax in India – Definitions and Basic Concepts of Income Tax: Assessee – Deemed Assessee – Assessee-in-default – Assessment Year – Previous Year - Person – Agricultural Income – Heads of Income – Gross Total Income – Total Income — Incomes Exempt from Tax. Residential Status and Scope of Total Income: Meaning of Residential Status – Conditions applicable to an Individual Assessee – Incidence of Tax – Types of Incomes. (Theory only)

UNIT–II: INCOME FROM SALARIES:

Definition of 'Salary' – Characteristics of Salary – Computation of Salary Income: Salary u/s 17(1) – Annual Accretion – Allowances – Perquisites – Profits in lieu of Salary – Deductions u/s. 16 – Problems on computation of Income from Salary.

UNIT–III: INCOME FROM HOUSE PROPERTY:

Definition of 'House Property' – Exempted House Property incomes– Annual Value – Determination of Annual Value for Let-out House and Self-occupied House – Deductions u/s.24 – Problems on computation of Income from House Property.

UNIT–IV: PROFITS AND GAINS OF BUSINESS OR PROFESSION:

Definition of 'Business and Profession' – Procedure for computation of Income from Business – Revenue and Capital nature of Incomes and Expenses – Allowable Expenses u/s. 30 to 37 – Expenses expressly disallowed – Deemed Profits – Miscellaneous provisions u/s 44. Depreciation: Meaning – Conditions for charge of depreciation – Problems on computation of Income from Business.Income from Profession: Rules– procedure – problems on computation of Income from Profession.

UNIT-V: CAPITAL GAINS AND INCOME FROM OTHER SOURCES:

Introduction - Meaning – Scope of charge – Basis of charge – Short term and Long term Capital Assets – Transfer of Capital Asset – Deemed Transfer –Determination of Cost of Acquisition – Procedure for computation of Long-term and Short-term Capital Gains/Losses – Exemptions in respect of certain Capital Gains u/s. 54 – Problems on computation of capital gains - General Incomes u/s. 56(1) – Specific Incomes u/s. 56(2) – Dividends u/s. 2(22) – Winnings from lotteries Puzzles, crown world puzzles, Races – Interest on Securities – Gifts received by an Individual – Casual Income – Family Pension – Rent received on let out of Furniture- Plant and Machinery with/without Building – Deductions u/s. 57. (Theory only)

SUGGESTED READINGS:

1. Income Tax Law and Practice: V.P. Gaur & D.B Narang, Kalyani Publishers.
2. Taxation: Dr. M.N. Ravi, PBP.
3. Direct Taxes Law & Practice: Dr.Vinod K. Singhania&Dr.KapilSinghania, Taxmann
4. Income Tax: B.B. Lal, Pearson Education.
5. Taxation: R.G. Saha, Himalaya Publishing House Pvt. Ltd.
6. Income Tax: Johar, McGrawHill Education.
7. Taxation Law and Practice: Balachandran&Thothadri, PHI Learning.
8. Direct Tax Law and Practice : AhujaGirish

Paper DSC 401: EXCEL FOUNDATION

Objective: *Students will learn how to start working with M S Excel right from basics to Tables, Templates and Printing of their work.*

UNIT-I: **INTRODUCTION TO EXCEL:**
Workbooks and Worksheets, Moving Around a Worksheet, Ribbon tabs, Types of commands on the Ribbon, Using Shortcut Menus, Working with Dialogue Boxes, Task Panes, Getting started on your worksheet, Creating a chart, Printing your worksheet, Saving your worksheet, Exploring Data Types, Modifying Cell Contents, Deleting, Replacing, Editing of a cell. Some handy data entry techniques, Number Formatting.

UNIT-II: **WORKSHEET OPERATIONS:**
Moving and resizing windows, Switching among windows, Activating a worksheet, Adding, Deleting a worksheet, Changing a sheet tab color, Rearranging your worksheets, Hiding, un-hiding a worksheet, Worksheet View, Comparing sheets side by side, Selecting ranges, complete rows and columns, noncontiguous ranges, multi-sheet ranges, special types of cells. Copying or Moving Ranges. Paste Special dialogue box, Adding comments to cells.

UNIT-III: **TABLES AND FORMATTING:**
Creating a Table, Changing the Look of a Table, Navigating in a Table, Selecting parts of a Table, Adding, Deleting new rows or columns, Moving a Table, Working with the Total Row, Removing duplicate rows from a table. Sorting and filtering a table, Converting Table into Range. Formatting tools on the Home tab, Mini Toolbar, Fonts, Text Alignment, Wrapping text to fit a cell, Colors and Shading, Borders and Lines.Naming Styles.

UNIT–IV: **EXCEL FILES & TEMPLATES:**
Creating a New Workbook, Filtering filenames, Saving and Auto Recovery, Password-Protecting a Workbook, Recovering unsaved work, Protect Workbook options, Checking Compatibility. Creating a Excel Templates, Modifying a template, Custom Excel Templates, Default Templates, Editing your Template, Resetting the default workbook, Saving your Custom Templates, Getting ideas for creating Templates.

UNIT–V: **PRINTING YOUR WORK:** Normal, Page Layout, Page Break View, Choosing your printer, Specifying what you want to print, Changing Page Orientation, Specifying paper size, Adjusting page margins, Inserting a page break, Removing manual page breaks, Printing Row and Column Titles, Scaling printed output, Header or Footer Options, Preventing certain cells, Objects from being printed, Creating Custom Views of your Worksheet. Creating PDF files. Introducing Excel:

SUGGESTED READINGS:

1. Excel 2013 Bible: John Walkenbach, Wiley.
2. Microsoft Excel 2013: Data Analysis and Business Modeling: Winston, PHI
3. Excel Data Analysis - Modeling and Simulation: Hector Guerrero, Springer.
4. Excel Functions and Formulas: Bernd Held,BPB Publications.
5. Financial Analysis and Modeling using Excel and VBA: ChandanSengupta, Wiley

Paper DSC 402: BUSINESS STATISTICS - II

Objective: *To inculcate analytical and computational ability among the students.*

UNIT-I: REGRESSION:
Introduction - Linear and Non Linear Regression – Correlation Vs. Regression - Lines of Regression - Derivation of Line of Regression of Y on X - Line of Regression of X on Y - Using Regression Lines for Prediction.

UNIT-II: INDEX NUMBERS:
Introduction - Uses - Types - Problems in the Construction of Index Numbers - Methods of Constructing Index Numbers - Simple and Weighted Index Number (Laspeyre - Paasche, Marshall – Edgeworth) - Tests of Consistency of Index Number: Unit Test - Time Reversal Test - Factor Reversal Test - Circular Test - Base Shifting - Splicing and Deflating of Index Numbers.

UNIT-III: TIME SERIES:
Introduction - Components – Methods-Semi Averages - Moving Averages – Least Square Method - Deseasonalisation of Data – Uses and Limitations of Time Series.

UNIT-IV: PROBABILITY:
Probability – Meaning - Experiment – Event - Mutually Exclusive Events - Collectively Exhaustive Events - Independent Events - Simple and Compound Events - Basics of Set Theory – Permutation – Combination - Approaches to Probability: Classical – Empirical – Subjective - Axiomatic - Theorems of Probability: Addition – Multiplication - Baye's Theorem.

UNIT-V: THEORITECAL DISTRIBUTIONS:
Binomial Distribution: Importance – Conditions – Constants - Fitting of Binomial Distribution.
Poisson Distribution: – Importance – Conditions – Constants - Fitting of Poisson Distribution.
Normal Distribution: – Importance - Central Limit Theorem - Characteristics – Fitting a Normal Distribution (Areas Method Only).

SUGGESTED READINGS:

1. Statistics for Management: Levin & Rubin, Pearson,
2. Fundamentals of Statistics: Gupta S.C, Himalaya
3. Business Statistics: Theory & Application, P. N. Jani, PHI Learning
4. Business Statics – II: Dr. OBul Reddy, Dr. D. Shridevi - PBP
5. Business Statistics: Dr. J. K. Thukral, Taxmann Publications
6. Business Statistics: K. Alagar, Tata McGraw Hill
7. Fundamentals of Statistical: S. P Gupta , Sultan Chand
8. Business Statistics: J. K. Sharma,Vikas Publishers
9. Business Statistics: Vora, Tata McGraw Hill
10. Statistics-Problems and Solutions: Kapoor V.K, S. Chand
11. Statistics-Teory, Methods and Applications: SanchetiD.C. &Kapoor V.K
12. Business Statistics: S. K. Chakravarty, New Age International Publishers
13. Business Statistics-G.Laxman,Vasudeva Reddy, K.Goud, TaxmannPublications,Hyderabad.

Paper DSC 403: WEB TECHNOLOGIES

Hours Per Week:7(3T+4P **Credits**: 5
Exam Hours:1½ **Marks:** 50U+35P+15I

Objective:*To gain skills of usage of Web Technologies to design Web pages.*

UNIT-I: INTRODUCTION:

Introduction to web technology – HTML – types of HTML tags-basic Structure of HTML – Web designprinciples – HTML attributes – styles – Hypertext - Formatting text – Forms & formulating instructions & formulation elements – Commenting code – Back grounds – Images-Hyperlinks – Lists –Tables – Frames

UNIT-II: AN OVER VIEW OF DYNAMIC WEB PAGES & DYNAMIC WEB PAGE:

An over view of dynamic web pages – technologies: Introduction to Dynamic HTML programing - Cascading style sheets (CSS) – types and advantages of CSS – CSS basic syntax and structure - Changing Text and Attributes - Dynamically changing style - Text Graphics and placements - Creating multimedia effects with filters and Transactions.

UNIT-III: JAVA SCRIPT&:

Java Script: Introduction - Client side Java script - Server side Java script - Core features - Data types and variables – Operators - Expressions and statements – Functions – Objects – Array - Date and math related objects - Document object model - Eventhandling.

UNIT-IV: EVENTS AND EVENT HANDLERS:

Events And Event Handlers: General information about Events – Event – OnAbort – OnClick - Ondbl click - Ondrag drop – Onerror - Onfocus - Onkey Press – Onkey Up – Onload - Onmouse Down – Onmouse Move - Onmouse Out – Onmouse Over - Onmove - Onrest – Onresize - Onselect - Onsubmit - Onunload.

UNIT-V: EXTENSIBLE MARKUP LANGUAGE (XML:

Extensible Markup Language (XML): Introduction - Creating XML Documents - XML style Sheet – Hyperlinks in XML Document Object Model - XML Query Language.

LAB WORK: CREATING A WEBSITE WITH DYNAMIC FUNCTIONALITY USING CLIENT- SIDE AND SERVER SIDE SCRIPTING.

SUGGESTED READINGS:

1. Web Technology: IndrakantiSekhar, V.N. Battu, Himalaya Publishers.
2. Internet & World Wide Web How to Program: Deitel&Deitel,Pearson.
3. Web programming: ChrisBates.
4. HTML & XML An Introduction NIIT,PHI.
5. HTML for the WWW with XHTML & CSS: Wlizabeth Castro,Pearson
6. Internet and Web Technologies: Raj Kamal, McGrawHill.
7. Web Technology: A Developer's Perspective: Gopalan&Sivaselvan,PHI.
8. Internet Technology and Web Page Design: R.Singh&M.Sonia,Kalyani.
9. Web Technology and Design by Xavier, New Age InternationalPub.

Paper GE: a) BUSINESS ECONOMICS

Objective:*Toacquire knowledge for application of economic principles and tools in businesspractices.*

UNIT-I: INTRODUCTION:
Business Economics: Meaning - Nature – Characteristics - Importance and Role - Micro & Macro Economics - Scope - Objectives - Law of Diminishing marginal utility - Law of Equi-marginal utility.

UNIT- II: DEMAND ANALYSIS:
Meaning – Function - Factors influencing Demand -Types of Demand -Demand Curve - Law of Demand –Exceptions to the law of demand-Elasticity of Demand: Concept - Types of elasticity of demand-price, income and cross Elasticity of Demand –measurement of elasticity—arc and point methods—Importance of various Elasticity of Demand

UNIT-III: SUPPLY ANALYSIS:
Law of Supply - Factors influencing Supply - Market Equilibrium- Consumer Surplus - Theory of Consumer behavior - Utility and indifference curve analysis.

UNIT–IV: PRODUCTION ANALYSIS:
Concept of Production –production function-Total Production - Marginal Production - Average Production –returns to a factor- Law of Variable Proportions - Law of Returns to Scale – Isocost – Isoquants - Economies and Dis-economies of Scale.

UNIT-V: COST AND REVENUEANALYSIS:
Theory of Cost - Concepts of Cost - Short run and Long run cost curves - Traditional and Modern Approaches -Revenue Curves–relationship between total marginal and average revenues- --Break Even Analysis—Meaning – Assumptions – Uses and Limitations.

SUGGESTED READINGS:

1. Business Economics: V. G. Mankar, Himalaya Publishing House
2. Managerial Economics: VanithAgrawal, Pearson Education
3. Business Economics: H. L. Ahuja, S. Chand & Co. Ltd.
4. Business Economics : R. K. Lekhi, Kalyani Publishers
5. Business Economics: D. M. Mithani, Himalaya Publishing House
6. Business Economics: P. N. Chopra, Kalyani Publishers
7. Essential of Business Economics: D. N. Dwivedi, Vikas Publishers
8. Managerial Economics: Varshney and Maheswari, Sultan Chand
9. Business Economics: P. K. Mehta, Tax Mann Publication.

Paper GE: b) ADVANCED ASPECTS OF INCOME TAX

Objective: *To acquire conceptual and legal knowledge about Income Tax provisions relating to computation of Income from certain heads and other provisions relating to clubbing, aggregation of income and assessment procedure.*

UNIT–I: PROFITS AND GAINS OF BUSINESS OR PROFESSION:
Valuation of Stock Depreciation: Meaning – Assets used for Business – Block of Assets – Rates of Depreciation – Miscellaneous Provisions about depreciation – Computation of Depreciation.

UNIT-II: INCOME FROM OTHER SOURCES:
Winnings from lotteries Puzzles, crown world puzzles, Races Problems on computation on Income from Other Sources. Treatment of Agricultural Income. Heads of income: Gross Total Income – Taxable Income – Income Tax Rates. Problems on computation of Total Income of an Individual based on Residential Status.

UNIT-III: CLUBBING AND AGGREGATION OF INCOME:
Income of other persons included in the total income of Assesse – Income from Firm and AOP – Clubbing Provisions – Deemed Incomes – Provisions of set-off and Carry forward of losses – computation of Gross Total Income – Deductions from GTI u/s 80C to 80U – Problems on Computation of Taxable Income.

UNIT-IV: ASSESSMENT OF INDIVIDUALS:
Computation of Tax Liability – Applicability of Alternate Minimum Tax on Individual u/s 115JC – Problems on Computation of tax liability.

UNIT–V: ASSESSMENT PROCEDURE:
Income tax returns – Types of returns – Filing of e-return – Assessment – Types of assessment: Self-assessment – Provisional assessment – Regular assessment – Best judgement assessment – Reassessment – Rectification of mistakes – Notice on demand.

SUGGESTED READINGS:
1. Income Tax Law and Practice: V.P. Gaur & D.B Narang, Kalyani Publishers.
2. Direct Taxes Law & Practice: Dr. Vinod K. Singhania& Dr. KapilSinghania, Taxmann
3. Income Tax: M. Jeevarathinam& C. Vijay Vishnu Kumar, SCITECH Publications.
4. Taxation: R.G. Saha, Himalaya Publishing House Pvt. Ltd.
5. Income Tax: B. Lal, Pearson Education.
6. Income Tax: Johar, McGrawHill Education.
7. Taxation Law and Practice: Balachandran&Thothadri, PHI Learnin

Paper DSE 501 (a) : COST ACCOUNTING

Objective: *To make the students acquire the knowledge of cost accounting methods.*

UNIT-I: INTRODUCTION:
Cost Accounting: Definition – Features – Objectives – Functions – Scope – Advantages and Limitations - Essentials of a good cost accounting system- Difference between Cost Accounting and Financial Accounting – Cost concepts – Cost Classification.

UNIT-II: MATERIAL:
Direct and Indirect Material cost – Inventory Control Techniques – Stock Levels – EOQ – ABC Analysis – JIT - VED - FSND - Issue of Materials to Production – Pricing methods: FIFO - LIFO with Base Stock and Simple and Weighted Average methods.

UNIT-III: LABOUR AND OVERHEADS:
Labour: Direct and Indirect Labour Cost – Methods of Payment of Wages (only Incentive Plans): Halsey, Rowan, Taylor Piece Rate and Merrick Multiple Piece Rate Methods.
Overheads: Classification - Methods of Allocation - Apportionment and Absorption of overheads.

UNIT-IV: UNIT AND JOB COSTING:
Unit Costing: Features - Cost Sheet – Tender and Estimated Cost Sheet.
Job Costing: Features - Objectives – Procedure - Preparation of Job Cost Sheet.

UNIT-V: CONTRACT AND PROCESS COSTING:
Contract Costing: Features – Advantages - Procedure of Contract Costing – Guidelines to Assess profit on incomplete Contracts.
Process Costing: Meaning – Features – Preparation of Process Account – Normal and Abnormal Losses.

SUGGESTED READINGS:

1. Cost Accounting: Jain and Narang, Kalyani
2. Cost Accounting: Srihari Krishna Rao, Himalaya
3. Cost and Management Accounting: PrashantaAthma, Himalaya
4. Cost Accounting: Dr. G. Yogeshweran, PBP.
4. Cost Accounting: Jawaharlal, Tata Mcgraw Hill
5. Cost Accounting: Theory and Practice: Banerjee, PHI
6. Introduction to Cost Accounting: Tulsian, S.Chand
7. Cost Accounting: Horngren, Pearson
8. Cost Accounting: Ravi M. Kishore, Tax Mann Publications.

Paper DSE 501 (b) : FINANCIAL PLANNING & PERFORMANCE

Objective:*To make students to understand the Financial planning & Performance.*

UNIT I: STRATEGIC PLANNING:

Strategic planning: Analysis of external and internal factors affecting strategy - Long-term mission and goals - Alignment of tactics with long-term strategic goals - Strategic planning models and analytical techniques - Characteristics of successful strategic planning process -

Annual profit plan and supporting schedules: Operational budgets - Financial budgets - Capital budgets - Top-level planning and analysis: Pro forma income - Financial statement projections - Cash flow projections.

UNIT II: BUDGETING AND FORECASTING:

Budgeting Concepts: Operations and performance goals - Characteristics of a successful budget process - Resource allocation - Forecasting techniques: Regression analysis - Learning curve analysis - Expected value - Budgeting Methodologies: Annual business plans (master budgets) - Project budgeting - Activity-based budgeting - Zero-based budgeting - Continuous (rolling) budgets - Flexible budgeting

UNIT III: COST AND VARIANCE ANALYSIS:

Cost and Variance Analysis: Comparison of actual to planned results - Use of flexible budgets to analyze performance - Management by exception - Standard Cost System: Use of standard cost systems - Analysis of variation from standard cost expectations

UNIT IV: PERFORMANCE MEASURES:

Performance Measures: Product profitability analysis - Business unit profitability analysis - Customer profitability analysis - Return on investment - Residual income - Investment base issues - Key performance indicators (KPIs) - Balanced scorecard - Responsibility Centers and Reporting Segments: Types of responsibility centers - Transfer pricing - Reporting of organizational segments

UNIT V: TECHNOLOGY AND ANALYTICS:

Information Systems: Accounting information systems - Enterprise resource planning systems - Enterprise performance management systems - Data Governance: Data policies and procedures - Life cycle of data - Controls against security breaches - Technology-enabled finance transformation: System Development Life Cycle - Process automation - Innovative applications

Data analytics: Business intelligence - Data mining - Analytic tools - Data visualization

SUGGESTED READINGS:

1. Wiley CMAexcel Learning System, Part 1: Planning, Performance & Analytics
2. Strategic Management and Business Policy: Globalization, Innovation and Sustainability, 15th edition; Wheelen, Thomas L., et. al.; Prentice Hall
3. Cost Management: A Strategic Emphasis, 6th edition; Blocher, Edward, J., Stout, David E., Juras, Paul E., and Cokins, Gary; McGraw Hill
4. Horngreen's Cost Accounting: A Managerial Emphasis, 16th edition; Charles T., Datar, Srikant, and Rajan, Madhav; Pearson
5. Quantitative Methods for Business, 13th Edition; Anderson, David, R., Sweeney, Dennis J., Williams, Thomas A., Camm, Jeff, and Martin, R. Kipp; Cengage Learning
6. Management Accounting: An Integrative Approach; McNair-Connolly, C.J., Merchant, Kenneth A.; IMA.

Paper DSE 501 (c): INTERNATIONAL FINANCIAL REPORTING -I

Objective:*To make students to understand the International Financial Reporting.*

UNIT I: GENERAL PURPOSE OF FINANCIAL ACCOUNTING AND REPORTING AS PER US GAAP AND IFRS:

Conceptual framework: Standard Setting Bodies & Hierarchy - Elements of F/S - Primary objectives of financial reporting - Qualitative Characteristics of F/S - Fundamental Assumptions & Principles - Accounting Cycle & Preparation of F/S - General-purpose financial statements: Balance sheet - Income statement - Statement of comprehensive income - Statement of changes in equity - Statement of changes cash flows - Public company reporting requirements: SEC Reporting Requirements - Interim Financial Reporting - Segment Reporting - Revenue recognition: 5-Step approach to Revenue Recognition - Certain Customer's Rights & Obligations - Specific Arrangements - Long Term Construction Contracts

UNIT II: CURRENT ASSETS AND CURRENT LIABILITIES (AS PER US GAAP AND IFRS):

Monetary Current Assets & Current Liabilities: Cash & Cash Equivalents - Accounts Receivable - Notes Receivable - Transfers & Servicing of Financial Assets - Accounts Payable - Employee-related Expenses Payable - Inventory: Determining Inventory & Cost of Goods Sold - Inventory Valuation - Inventory Estimation Methods

UNIT III: FINANCIAL INVESTMENTS AND FIXED ASSETS (AS PER US GAAP AND IFRS):

Financial Investments: Investments in Equity Securities - Investment in Debt Securities - Financial Instruments - Tangible Fixed Assets: Acquisition of Fixed Assets - Capitalization of Interest - Costs Incurred After Acquisition - Depreciation - Impairment - Asset Retirement Obligation - Disposal & Involuntary Conversions - Intangible Assets: Knowledge-based intangibles (R&D, software) - Legal rights based intangibles (patent, copyright, trademark, franchise, license, leasehold improvements) – Goodwill

UNIT IV: FINANCIAL LIABILITIES (AS PER US GAAP AND IFRS):

Bonds Payable: Types of Bonds - Convertible bonds vs. Bonds with detachable warrants - Bond Retirement - Fair Value Option & Fair Value Election - Debt Restructuring: Settlement - Modification of terms

UNIT V: SELECT TRANSACTIONS (AS PER US GAAP AND IFRS):

Fair value measurements: Valuation techniques - Fair value hierarchy - Fair value concepts -Accounting changes and error correction: Changes in accounting estimate - Changes in accounting principle - Changes in reporting entity - Correction of an error - Contingencies: Possibility of occurrence (remote, reasonably possible or probable) - Disclosure vs. Recognition

Derivatives and Hedge Accounting: Speculation (non-hedge) - Fair value hedge - Cash flow hedge - Non-monetary exchanges: Exchanges with commercial substance - Exchanges without commercial substance - Leases: Operating lease - Finance lease - Sale leaseback

SUGGESTED READINGS:

1. Miles CPA Review Concept Book: Financial Accounting & Reporting, Miles Education
2. Wiley CPA Excel Exam Review Course Study Guide: Financial Accounting and Reporting, Wiley
3. IFRS & US GAAP Best Practices in Accounting World: GAAP Analysis, Rajesh Dhawan
4. Transparency in Financial Reporting: A concise comparison of IFRS and US GAAP 1st Edition, Ruth Ann McEwen, Harriman House Ltd.
5. IFRS and US GAAP: A Comprehensive Comparison, Steven E. Shamrock, Wiley
6. Wiley GAAP: Interpretation and Application of Generally Accepted Principles, Barry J. Epstein and Ralph Nach, Wiley
7. IFRS Simplified with Practical Illustration Part 1 & 2, Mr RammohanBhave and Dr Mrs Anjali RammohanBhave, CNBC TV 18.

Paper DSE 502 (a) : COMPUTERIZED ACCOUNTING

Objective: *To make the students to acquire the knowledge of computer software*

UNIT I: MAINTAINING CHART OF ACCOUNTS IN ERP:
Introduction-Getting Started with ERP - Mouse/Keyboard Conventions-Company Creation-Shut a Company-Select a Company-Alter Company Details-Company Features and Configurations-F11: Company Features-F12: Configuration-Chart of Accounts-Ledger-Group-Ledger Creation-Single Ledger Creation-Multi Ledger Creation-Altering and Displaying Ledgers-Group Creation-Single Group Creation-Multiple Group Creation-Displaying Groups and Ledgers-Displaying Groups-Display of Ledgers-Deletion of Groups and Ledgers – P2P procure to page.

UNIT II: MAINTAINING STOCK KEEPING UNITS (SKU):
Introduction-Inventory Masters in ERP - Creating Inventory Masters-Creation of Stock Group-Creation of Units of Measure-Creation of Stock Item-Creation of Godown-Defining of Stock Opening Balance in ERP Stock Category-Reports.

UNIT III: RECORDING DAY-TO-DAY TRANSACTIONS IN ERP:
Introduction-Business Transactions-Source Document for Voucher-Recording Transactions in ERP - Accounting Vouchers-Receipt Voucher (F6)-Contra Voucher (F4)-Payment Voucher (F5)-Purchase Voucher (F9)-Sales Voucher (F8)-Debit Note Voucher-Credit Note (Ctrl+F8)-Journal Voucher (F7).

UNIT IV: ACCOUNTS RECEIVABLE AND PAYABLE MANAGEMENT:
Introduction-Accounts Payables and Receivables-Maintaining Bill-wise Details-Activation of Maintain Bill-wise Details Feature-New Reference-Against Reference-Advance-On Account-Stock Category Report-Changing the Financial Year in ERP.

UNIT V: MIS REPORTS:
Introduction-Advantages of Management Information Systems-MIS Reports in ERP - Trial Balance - Balance Sheet-Profit and Loss Account-Cash Flow Statement-Ratio Analysis-Books and Reports - Day Book-Receipts and Payments-Purchase Register-Sales Register-Bills Receivable and Bills Payable.

SUGGESTED READINGS:

1. Computerised Accounting: GarimaAgarwal, Himalaya
2. Computerised Accounting: A. Murali Krishna, Vaagdevi publications
3. Computerised Accounting: Dr. G. Yogeshweran, PBP.
4. Aakash Business Tools: Spoken Tutorial Project IIT Bombay
5. Mastering Tally: Dinesh Maidasani, Firewal Media
6. Implementing Tally ERP 9: A.K Nadhani and K.K Nadhani, BPB Publications
7. Computerised Accounting and Business Systems: Kalyani Publications
8. Manuals of Respective Accounting Packages
9. Tally ERP 9: J.S. Arora, Kalyani Publications.

Paper DSE 502 (b): FINANCIAL DECISION MAKING - I

Objective: *To make students to understand the Financial Decision Making.*

UNIT I: FINANCIAL STATEMENT ANALYSIS

Basic Financial Statement Analysis: Common size financial statements - Common base year financial statements - Financial Ratios: Liquidity - Leverage - Activity - Profitability - Market Profitability analysis: Income measurement analysis - Revenue analysis - Cost of sales analysis - Expense analysis - Variation analysis - Special issues: Impact of foreign operations - Effects of changing prices and inflation - Off-balance sheet financing - Impact of changes in accounting treatment - Accounting and economic concepts of value and income - Earnings quality

UNIT II: FINANCIAL MANAGEMENT

Risk & Return: Calculating return - Types of risk - Relationship between risk and return
Long-term Financial Management: Term structure of interest rates - Types of financial instruments - Cost of capital - Valuation of financial instruments

UNIT III: RAISING CAPITAL

Raising Capital:Financial markets and regulation - Market efficiency - Financial institutions - Initial and secondarypublic offerings - Dividend policy and share repurchases - Lease financing

UNIT IV: WORKING CAPITAL MANAGEMENT

Managing working capital: Cash management - Marketable securitiesmanagement - Accounts receivable management - Inventory management - Short-term Credit: Types of short-term credit - Short-term credit management

UNIT V: CORPORATE RESTRUCTURING AND INTERNATIONAL FINANCE

Corporate Restructuring: Mergers and acquisitions - Bankruptcy - Other forms of restructuring
International Finance: Fixed, flexible, and floating exchange rates - Managing transaction exposure - Financinginternational trade - Tax implications of transfer pricing

SUGGESTED READINGS:

1. Wiley CMAexcel Learning System, Part 2: Strategic Financial Management
2. Interpretation and Application of International Financial Reporting Standards; Mackenzie, Bruce, Coetsee, Danie, Njikizana, Tapiwa, Chamboko, Raymond, Colyvas, Blaise,andHanekom, Brandon; Wiley
3. Financial Reporting & Analysis, 13th edition; Gibson, Charles H.; South-Western Cengage Learning
4. Financial Statement Analysis, 10th edition; Subramanyam, K.R., and Wild, John L.; McGraw Hill
5. Principles of Corporate Finance, 11th edition; Brealey, Richard, A., Myers, Stewart C., and Allen, Franklin; McGraw Hill
6. Fundamentals of Financial Management, 13th edition; Van Horn, James, C., and Wachowicz, John M. Jr.; FT / Prentice Hall

Paper DSE 502 (c) : INTERNATIONAL TAX & REGULATION

Objective:*To make students to understand the International Tax & Regulation.*

UNIT I: TAXATION OF INDIVIDUALS:
Individual Income Tax Return: Filing Status - Cash basis and Accrual basis
Gross Income: Wages, Salaries, Bonus, Commission, Fees & Tips - Interest & Dividend Income - Business Income - Capital Gains & Losses - Passive Income - Farming Income - Deductions: Adjustments - Deductions from AGI - Calculating Tax: Tax Credits - Alternative Minimum Taxes - Other Taxes - Estimated Tax penalty

UNIT II: PROPERTY TRANSACTIONS & DEPRECIATION:
Capital Gains & Losses - Gains & Losses from Sale of Long-term Business Property - Depreciation & Amortization

UNIT III: TAXATION OF CORPORATIONS:
C-Corporations:Formation - Income Tax Return - Income - Deductions - Reconciliation of Taxable Income with books - Calculating Tax - Corporate Earnings & Distributions - Corporate Liquidation & Reorganizations - S-Corporations: Eligibility criteria - Income Tax Return - Shareholder basis - Earnings and Distribution - Termination of Election

UNIT IV: TAXATION OF OTHER ENTITIES:
Partnerships: Formation - Income Tax Return - Partner basis - Partnership Distributions - Sale of Partnership Interest by a Partner - Termination of Partnership - Estate, Trust & Gift Taxation: Estate and Trust Fiduciary Income Tax Return - Estate Tax Return - Gift Tax Return - Generation-skipping transfer Tax - Tax Exempt Organizations: Formation - Income Tax Return

UNIT V: STATUTORY REGULATIONS, ACCOUNTANT RESPONSIBILITIES, BUSINESS STRUCTURES:
Federal Security Regulations: Securities Act of 1933 - Securities Exchange Act of 1934 - Other federal security regulations - Professional & Legal Responsibilities: Accountant Common Law Liabilities - Accountant Statutory Liabilities - Accountant Liabilities for Privileged Information - Accountant Criminal Liabilities - Employment Regulations - Environmental Regulations - Antitrust Regulations - Business Structures: Sole Proprietorships - Partnerships - Corporations

SUGGESTED READINGS:

1. Miles CPA Review Concept Book: Regulation, Miles Education
2. Wiley CPA Excel Exam Review Course Study Guide: Regulation, Wiley
3. Internal Revenue Code: Income, Estate, Gift, Employment and Excise Taxes, CCH Tax Law Editors
4. Federal Income Tax: Code and Regulations--Selected Sections, Martin B. Dickinson, Wolters Kluwer
5. Federal Income Taxation by Katherine Pratt and Thomas D. Griffith, Wolters Kluwer
6. Federal Income Taxation (Concepts and Insights), Marvin Chirelstein and Lawrence Zelenak, Foundation Press

Paper DSE 503 (a) :MANAGEMENT INFORMATION SYSTEMS

Hours Per Week: 7 (3T+4P) **Credits**: 5
Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *To equip the students with finer nuances of MIS.*

UNIT–I: INTRODUCTION TO MIS:
The Technical and Business Perspective, Organization Structure, Evaluation of MIS through Information System, The Decision Making Process , System Approach to Problem Solving, The Structure of Management Information System, MIS Organization within the Company.

UNIT-II: INFORMATION SYSTEMS FOR DECISION MAKING:
Evolution of an Information System, Basic Information Systems, Decision Making and MIS, Decision Assisting Information System, Concepts of Balanced MIS Effectiveness and Efficiency Criteria.

UNIT-III: DEVELOPMENT OF MIS:
Methodology and Tools/Techniques for Systematic Identification, Evaluation and Modification of MIS.*Enterprise Resource Planning:* Introduction, Basics of ERP, Evolution of ERP, Enterprise Systems in Large Organizations, Benefits and Challenges of Enterprise Systems, *E-Enterprise System :* Introduction: Managing the E-enterprise, Organisation of Business in an E-enterprise, E-business, E-commerce, E-communication, E-collaboration.

UNIT-IV: ADVANCED MIS:
Concepts, Needs and Problems in Achieving Advanced MIS, DSS., Business intelligence + process management, systems development, and security.

UNIT-V: COLLABORATION, IMPACT & PITFALLS IN MIS:
Collaboration processes and information systems, Impact of Web 2.0 and social media on business process, Pitfalls in MIS Development: Fundamental Weakness, Soft Spots in Planning and Design Problems.

SUGGESTED READINGS:

1.Murdic, Rose and Clagett- Information Systems for Modern Management, PHI, New Delhi.
2.Process, Systems, and Information, David M. Kroenke,
3. MIS Cases Decision Making with Application Software, 4th Edition, Lisa Miller
4.Laudon-Laudon- Management Information Systems, Pearson Education, New Delhi.

Paper DSE 503 (b) :E-COMMERCE

Hours Per Week: 7 (3T+4P) **Credits**: 5
Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *to acquire conceptual and application knowledge of ecommerce.*

UNIT-I: INTRODUCTION:
E-Commerce: Meaning - Advantages & Limitations - E-Business: Traditional & Contemporary Model, Impact of E-Commerce on Business Models - Classification of E-Commerce: B2B - B2C - C2B - C2C - B2E - Applications of Ecommerce: E-Commerce Organization Applications - E-Marketing - E-Advertising - E-Banking - Mobile Commerce - E-Trading - E-Learning - E-Shopping.

UNIT-II:FRAMEWORK OF E-COMMERCE:
Framework of E-Commerce: Application Services - Interface Layers - Secure Messaging - Middleware Services and Network Infrastructure - Site Security - Firewalls & Network Security - TCP/IP – HTTP - Secured HTTP – SMTP - SSL.
Data Encryption: Cryptography – Encryption – Decryption - Public Key - Private Key - Digital Signatures - Digital Certificates.

UNIT-III:CONSUMER ORIENTED E-COMMERCE APPLICATIONS:
Introduction - Mercantile Process Model: Consumers Perspective and Merchant's Perspective - Electronic Payment Systems: Legal Issues & Digital Currency - E-Cash & E-Cheque - Electronic Fund Transfer (EFT) - Advantages and Risks - Digital Token-Based E-Payment System - Smart Cards.

UNIT-IV:ELECTRONIC DATA INTERCHANGE:
Introduction - EDI Standards - Types of EDI - EDI Applications in Business – Legal - Security and Privacy issues if EDI - EDI and E-Commerce - EDI Software Implementation.

UNIT-V: E-MARKETING TECHNIQUES:
Introduction - New Age of Information - Based Marketing - Influence on Marketing - Search Engines & Directory Services - Charting the On-Line Marketing Process - Chain Letters - Applications of 5P's (Product, Price, Place, Promotion, People) E-Advertisement - Virtual Reality & Consumer Experience - Role of Digital Marketing.
Lab work: *Using Microsoft Front Page Editor and HTML in Designing a Static Webpage/Website.*

SUGGESTED READINGS:

1. Frontiers of Electronic Commerce: Ravi Kalakota, Andrew B Whinston, Pearson
2. E-Commerce: Tulasi Ram Kandula, HPH.
3. E-Commerce: An Indian Perspective: P.T. Joseph, S.J, PHI
4. Electronic Commerce, Framework Technologies & Applications: Bharat Bhasker, McGraw Hill
5. Introduction To E-Commerce: Jeffrey F Rayport, Bernard J. Jaworski: Tata McGraw Hill
6. Electronic Commerce, A Managers' Guide: Ravi Kalakota, Andrew B Whinston
7. E-Commerce & Computerized Accounting: Rajinder Singh, Er. KaisarRasheed, Kalyani
8. E-Commerce & Mobile Commerce Technologies: Pandey, SaurabhShukla, S. Chand
9. E-Business 2.0, Roadmap For Success: Ravi Kalakota, Marcia Robinson, Pearson
10. Electronic Commerce: Pete Loshin / John Vacca, Firewall Media
11. E-Commerce, Strategy, Technologies And Applications : David Whiteley, Tata Mcgraw Hill

Paper DSE 503 (c) :MOBILE APPLICATIONS

Hours Per Week: 7 (3T+4P) **Credits**: 5
Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *To understand and apply the mobile applicatios.*

UNIT-I: INTRODUCTION:
What is Android, Android versions and its feature set The various Android devices on the market, The Android Market application store ,Android Development Environment - System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs), the Android Software Stack, The Linux Kernel, Android Runtime - Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework, Creating a New Android Project ,Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files,

UNIT-II: MOBILE SOFTWARE:
Understanding Java SE and the Dalvik Virtual Machine, The Directory Structure of an Android Project , Common Default Resources Folders, The Values Folder, Leveraging Android XML, Screen Sizes, Launching Your Application: The AndroidManifest.xml File,
Creating Your First Android Application, Android Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications Content Providers: Data Management, Android Intent Objects: Messaging for Components.
Android Manifest XML: Declaring Your Components, Designing for Different Android Devices, Views and View Groups, Android Layout Managers, The View Hierarchy, Designing an Android User Interface using the Graphical Layout Tool.

UNIT-III: MOBILE DISPLAY:
Displaying Text with TextView, Retrieving Data from Users, Using Buttons, Check Boxes and Radio Groups, Getting Dates and Times from Users, Using Indicators to Display Data to Users, Adjusting Progress with SeekBar, Working with Menus using views, Gallery, ImageSwitcher, GridView, and ImageView views to display images, Creating Animation, Saving and Loading Files, SQLite Databases, Android Database Design, Exposing Access to a Data Source through a Content Provider, Content Provider Registration, Native Content Providers

UNIT-IV: MOBILE APPLICATIONS:
Intent Overview, Implicit Intents, Creating the Implicit Intent Example Project, Explicit Intents, Creating the Explicit Intent Example Application, Intents with Activities, Intents with Broadcast Receivers, An Overview of Threads, The Application Main Thread, Thread Handlers, A Basic Threading Example, Creating a New Thread, Implementing a Thread Handler, Passing a Message to the Handler. Sending SMS Messages Programmatically, Getting Feedback after Sending the Message Sending SMS Messages Using Intent Receiving, sending email, Introduction to location-based service, configuring the Android Emulator for Location-Based Services, Geocoding and Map-Based Activities,Playing Audio and Video, Recording Audio and Video, Using the Camera to Take and Process Pictures

UNIT-V: MOBILE APP DEVELOPMENT & INSTALLATION:

Introduction to Windows Phone App Development, Installing the Windows Phone SDK, Creating Your First XAML for Windows Phone App. Understanding the Role of XAP Files, the Windows Phone Capabilities Model, the Threading Model for XAML-Based Graphics and Animation in Windows Phone, Understanding the Frame Rate Counter, The Windows Phone Application Analysis Tool, Reading Device Information, Applying the Model-View-ViewModel Pattern to a Windows Phone App, Property Change Notification, Using Commands

SUGGESTED READINGS:

1. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India Pvt Ltd, 2014.
2. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition, O'Reilly SPD Publishers, 2015
3. J F DiMarzio, "Beginning Android Programming with Android Studio", 4th Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126565580
4. AnubhavPradhan, Anil V Deshpande, " Composing Mobile Apps" using Android, Wiley 2014, ISBN: 978-81-265-4660-2

Web Resource :

Google Developer Training, "Android Developer Fundamentals Course – Concept Reference", Google Developer Training Team, 2017. https://www.gitbook.com/book/google-developer-training/android-developerfundamentals-course-concepts/details (Download pdf file from the above link)

Paper PR : RESEARCH METHODOLOGY & PROJECT REPORT

Objective: *To introduce the basics of conducting research in social sciences.*

UNIT-I: INTRODUCTION, MEASUREMENT AND HYPOTHESIS TESTING:
Meaning of Research-Steps involved- Identification of Problem- Steps involved in the selection of problem-Research Design-Meaning and Types- Measurement Levels/Scales - Scaling Techniques-Hypothesis-Meaning - Types – Testing Procedure.

UNIT-II:PARAMETRIC AND NON PARAMETRIC TESTS AND RESEARCH REPORT:
Introduction - t-Test - F-Test - Chi Square Test - Anova (One-Way Anova, Two-Way Anova).concepts only Contents of a Research Report.

SUGGESTED READINGS:

1. Research Methodology: Himalaya Publications.
2. Methodology of Research in Social Sciences: Krishna Swamy,
3. Research Methodology: Kothari &Garg, New Age Publication
4. Research Methodology: Paneerselvam R, PHI
5. Research Methodology: Dr Vijay Upagade& Dr ArvindShende, S. Chand Publications
6. Research Methodology: Ranjit Kumar, Pearson Publication
7. Reading in Research Methodology in Commerce & Business Management: Achalapathi KV,
8. Research Methodology: Sashi.K Gupta, PraneethRangi, Kalyani Publishers.

GUIDELINES FOR PROJECT WORK

1) Project work is a part of the prescribed curriculum to B. Com students.
2) Project work is allotted to a group of 4 students.
3) During the IV semester, students are expected to undergo internship at a business firm/ Government Department /Software organization/Voluntary organization as per the guidance of teacher concerned.
4) Students should get a certificate from the organization.
5) At the end of Semester-VI, the project reports would be evaluated by the external examiner designated by the Controller of Examinations, from the panel submitted by the Board of Studies in Commerce. The Examiner would evaluate the project reports for a maximum of 35 marks and conduct Viva-Voce examination for 15 marks. The award lists duly signed would be sent the Controller of Examinations.
6) Examiners will examine the following in the project report: i) Survey/Analysis on the topic chosen; ii) Method of data collection; iii) Presentation: Style, Comprehensiveness, graphs, charts etc.; iv) Analysis and inference and implications of the study; v) Bibliography.
7) Students must ensure that they maintain **regular contact with their supervisor** and also that they provide the supervisor with drafts of their work at regular intervals.
8) Students are required to submit a project report on a topic related/connected with trade, industry & commerce. Project can be done by taking the information from the select organization focusing on areas like marketing, finance, human resource, operations, general management etc.

9) Project should be a practical, in-depth study of a problem, issue, opportunity, technique or procedure or some combination of these aspects of business. The Students are required to define an area of investigation, assemble relevant data, analyse the data, draw conclusions and make recommendations.

ORGANISATION OF PROJECT REPORT

1) Project report should be presented in the following sequence:
i) Title page; ii) Student's declaration; iii) Supervisor's certificate; iv) Internship certificate; v) Abstract; vi) Acknowledgements; vii) Table of contents; viii) List of tables; ix) List of figures; x) List of appendices.

2) Chapter Design should be as follows:

Chapter-I: **Introduction**: this chapter includes the research problem, need for study/significance of the project, objectives, methodology (hypotheses, statistical tools, data source, scope, sample, chapter design).
Chapter-II:**Company Profile:** this chapter should contain a brief historical retrospect about the entity of your study.
Chapter-III: D**ata Analysis and interpretation:** this chapter should present the data analysis and inferences.
Chapter-IV: **Summary and Conclusions**: This Chapter should give an overview of the project, conclusions, implications, recommendations and scope for further research.
Bibliography: lists the books, articles, and websites that are referred and used for research on the topic of the specific project. Follow Harvard style of referencing.
Appendices: the data, used to prepare the tables for analysis, may not be feasible to incorporate as part of chapters, may given as appendices.

TECHNICAL SPECIFICATIONS OF THE PROJECT

1) Project should be typed on **A4 white paper**, and be **1.5 spaced.**
2) All pages should be **numbered**, and numbers should be placed at the centre of the bottom of the page.
3) All tables, figures and appendices should be consecutively numbered or lettered, and suitably labeled.
4) 3 bound copies&**a soft-copy** should be handed in to the **principal/director of your college/institute** at the time of submission.
5) bibliography and referencing: Referencing is necessary to avoid plagiarism, to verify quotations and to enable readers to follow-up and read more fully the cited author's arguments. Reference is given within the text of the project as well as at the end of the project. The basic difference between citation and a reference list (bibliography) is that the latter contains full details of all the in-text citations.

- **Citation** provides brief details of the author and date of publication for referencing the work in the body of the text.
- **Reference list** is given at the end of the text and is a list of all references used with additional details provided to help identify each source.

Proper referencing is as crucial aspect of your project. You are therefore strongly advised to talk to your supervisor about this, in order to make sure that your project report follows the appropriate referencing system.

Paper DSE 601 (a) : COST CONTROL AND MANAGEMENT ACCOUNTING

Objective: *To be acquaint with Cost Control techniques, Managerial Accounting decision-making techniques and reporting methods.*

UNIT-I: INTRODUCTION TO MANAGEMENT ACCOUNTING &MARGINAL COSTING:

Meaning and Importance of Management Accounting – Marginal Cost Equation – Difference between Marginal Costing and Absorption Costing – Application of Marginal Costing – CVP Analysis – Break Even Analysis: Meaning – Assumptions – Importance - Limitations. Marginal Costing for Decision Making-Make or Buy – Add or Drop Products – Sell or Process Further – Operate or Shut-down – Special Order Pricing – Replace or Retain.

UNIT-II: BUDGETARY CONTROL AND STANDARD COSTING:

Budget: Meaning – Objectives – Advantages and Limitations – Essentials of Budgets - Budgetary Control - Classification of Budgets - Preparation of Fixed and Flexible Budgets. Standard Costing: Meaning – Importance – Standard Costing and Historical Costing - Steps involved in Standard Costing. Variance Analysis: Material variance - Labour variance - Overhead variance .

UNIT-III: TECHNIQUES OF FINANICAL STATEMENT ANALYSIS:

Meaning – Objectives - Techniques: Comparative Statement, Common Size Statement, Trend Analysis. Ratios- Meaning , Objectives and Classification—Computation of Activity, Liquidity, Solvency and Profitability Ratios.

UNIT-IV: FUNDS FLOW ANANLYSIS:

Concept of Funds – Meaning and Importance – Limitations – Statement of Changes in Working Capital – Statement of Sources and Application of Funds.

UNIT-V: CASH FLOW ANALYSIS (AS-3):

Meaning – Importance – Differences between Funds Flow and Cash Flow Statements – Procedure for preparation of Cash Flow Statement.

SUGGESTED READINGS:

1. Management Accounting- Principles & Practice: Sharma RK &Shashi K. Gupta, Kalyani
2. Advanced Managerial Accounting: Srihari Krishna Rao, Himalaya
3. Advanced Managerial Accounting: Dr. Sundaram, PBP
3. Advanced Management Accounting: Robert S. Kaplan & Anthony A. Atkinson, Prentice-Hall
4. Management Accounting: Rustagi R.P, Galgotia
5. Managerial Accounting: Ronald W. Hilton, TMH

Paper DSE 601 (b) : FINANCIAL CONTROL

Objective:*To make students to understand the Financial Control.*

UNIT I: EXTERNAL FINANCIAL REPORTING DECISIONS (AS PER US GAAP & IFRS):

Financial Statements: Balance sheet - Income statement - Statement of Comprehensive Income - Statement of changes in equity - Statement of cash flows - Integrated reporting

UNIT II: RECOGNITION, MEASUREMENT, VALUATION, AND DISCLOSURE (AS PER US GAAP & IFRS) :

Assets, Liabilities & Equity: Asset valuation - Valuation of liabilities - Equity transactions - Income: Revenue recognition - Income measurement - Major differences between U.S. GAAP and IFRS

UNIT III: COST MANAGEMENT:

Measurement concepts: Cost behavior and cost objects - Actual and normal costs - Standard costs - Absorption (full) costing - Variable (direct) costing - Joint and by-product costing - Costing Systems: Joint and by-product costing - Job order costing - Process costing - Activity-based costing - Life-cycle costing -Overhead costs: Fixed and variable overhead expenses - Plant-wide versus departmental overhead -Determination of allocation base - Allocation of service department costs

UNIT IV: SUPPLY CHAIN MANAGEMENT AND BUSINESS PROCESS IMPROVEMENT:

Supply chain management: Lean resource management techniques - Enterprise resource planning (ERP) - Theory of constraints - Capacity management and analysis - Business Process Improvement: Value chain analysis - Value-added concepts - Process analysis, redesign, and standardization - Activity-based management - Continuous improvement concepts - Best practice analysis - Cost of quality analysis - Efficient accounting processes

UNIT V: INTERNAL CONTROLS:

Governance, Risk & Compliance: Internal control structure and management philosophy - Internal control policies for safeguarding and assurance - Internal control risk - Corporate governance - External audit requirements - System Controls & Security Measures: General accounting system controls - Application and transactioncontrols - Network controls - Backup controls - Business continuity planning

SUGGESTED READINGS:

1. Wiley CMAexcel Learning System, Part 1: Planning, Performance & Analytics
2. Intermediate Accounting, 17th edition; Kieso, Donald E., Weygandt, Jerry J., and Warfield, Terry D.; Wiley
3. Intermediate Accounting, 11th edition; Nikolai, Loren A., Bazley John D., and Jones, Jefferson P., South-Western Cengage Learning
4. Cost Management: A Strategic Emphasis, 6th edition; Blocher, Edward, J., Stout, David E., Juras, Paul E., and Cokins, Gary; McGraw Hill
5. Horngreen's Cost Accounting: A Managerial Emphasis, 16th edition; Charles T., Datar, Srikant, and Rajan, Madhav; Pearson
6. Management Accounting: An Integrative Approach; McNair-Connolly, C.J., Merchant, Kenneth A.; IMA

Paper DSE 601(c) :INTERNATIONALFINANCIAL REPORTING - II

Objective:*To make students to understand the International Financial Reporting.*

UNIT I: PENSIONS & POST-EMPLOYMENT BENEFITS (AS PER US GAAP & IFRS):
Defined contribution pension plans - Defined benefit pension plans: Pension obligations - Pension plan assets - Net pension expense - Other Post-retirement benefits

UNIT II: INCOME TAXES (AS PER US GAAP & IFRS):
Income tax expense: Current income tax expense - Deferred income tax expense - Deferred taxes on balance sheet: Deferred tax assets - Deferred tax liabilities - Specific accounting - considerations: Net Operating Losses (NOL) - Investee's undistributed dividends

UNIT III: EQUITY (AS PER US GAAP & IFRS):
Equity accounts: Common Stock - Preferred Stock - Additional Paid-In Capital - Retained Earnings - Accumulated Other Comprehensive Income - Treasury Stock - Specific accounting considerations: Share-based Payments to Employees - Equity Securities Classified as Debt
Presentation of Equity: On Balance sheet - On Statement of Changes in Equity - Earnings per Share (EPS): Basic EPS - Diluted EPS

UNIT IV: SELECT TRANSACTIONS (AS PER US GAAP & IFRS):
Business Combinations and Consolidations: Acquisitions - Non-controlling Interest - Intercompany Transactions - Variable Interest Entities (VIE) - Foreign currency: Remeasurement - Translation

UNIT V: NOT-FOR-PROFIT AND GOVERNMENTAL ACCOUNTING AND REPORTING (AS PER US GAAP):
Not-for-Profit (NFP) Entities: NFP Financial Statements - Contribution Revenue - Specific Accounting Considerations - Colleges and Universities - Voluntary Health and Welfare Organizations - Health Care Organizations - Governmental Entities: Fund types (Governmental funds, Proprietary funds, Fiduciary funds) - Modified Accrual Accounting - Inter-fund transactions - Government Financial Reporting

SUGGESTED READINGS:

1. Miles CPA Review Concept Book: Financial Accounting & Reporting, Miles Education
2. Wiley CPA Excel Exam Review Course Study Guide: Financial Accounting and Reporting, Wiley
3. IFRS & US GAAP Best Practices in Accounting World: GAAP Analysis, Rajesh Dhawan
4. Transparency in Financial Reporting: A concise comparison of IFRS and US GAAP 1st Edition, Ruth Ann McEwen, Harriman House Ltd.
5. IFRS and US GAAP: A Comprehensive Comparison, Steven E. Shamrock, Wiley
6. Wiley GAAP: Interpretation and Application of Generally Accepted Principles, Barry J. Epstein and Ralph Nach, Wiley
7. IFRS Simplified with Practical Illustration Part 1 & 2, Mr RammohanBhave and Dr Mrs Anjali RammohanBhave, CNBC TV 18

Paper DSE 602(a) : THEORY AND PRACTICE OF GST

Objective: *To equip the students with the knowledge regarding Theory and Practice of GST.*

UNIT I: INTRODUCTION TO GST:

Introduction – GST - Taxes Subsumed under GST -Determination of Tax - Registration -Process of Registration - Cancellation and renovation of registration - Supply of Goods and Services - Transition to GST - Registered Business -Availed Input Tax Credit -Unavailed CENVAT credit and Input VAT on capital goods-Availing the input credit held in closing stock -Invoicing -Tax Invoice -Bill of Supply - Credit Note, Debit Note and Supplementary Invoice-Transportation of goods without issue of Invoice - Input Credit Mechanism - Input Tax - GST Returns - Payment of Tax.

UNIT II: GETTING STARTED WITH GST:

Introduction - Enabling GST and Defining Tax Details-Transferring Input Tax credit to GST -Intrastate Supply of Goods-Intrastate Inward Supply -Intrastate Outward Supply -Interstate -Interstate Outward Supply - Return of Goods -Purchase Returns -Sales Returns -Supplies Inclusive of Tax -Defining Tax Rates at Master and Transaction Levels - Defining GST Rates at Stock Group Level-Defining GST Rate at Transaction Level -Hierarchy of Applying Tax Rate Details –Reports.

UNIT III: RECORDING ADVANCED ENTRIES, GST ADJUSTMENT AND RETURN FILING:

Introduction -Accounting of GST Transactions -Purchases from Composition Dealer -Purchases from Unregistered Dealers-Exports -Imports -Exempted Goods -SEZ Sales -Advance Receipts and payments - Mixed Supply and Composite Supply under GST -Mixed Supply of Goods -Composite Supply of Goods -GST Reports - Generating GSTR- Report in ERP -Input Tax Credit Set Off -GST Tax Payment -Time line for payment of GST tax -Modes of Payment -Challan Reconciliation -Exporting GSTR- return and uploading in GST portal.

UNIT IV: GETTING STARTED WITH GST (SERVICES):

Introduction -Determination of supply of services -Determining the Place of Supply of Services -Enabling GST and Defining Tax Details-Transferring Input Tax credit to GST -Intrastate Supply of Goods - Intrastate Inward Supply-Intrastate Outward Supply -Interstate Supply -Interstate Outward Supply - Interstate Inward Supply -Interstate Outward Supply of Services -Cancellation of Services -Cancellation of Inward Supplies -Cancellation of Outward Supply of Services -Defining Tax Rates at Master and Transaction Levels.

UNIT V: RECORDING ADVANCED ENTRIES AND MIGRATION TO ERP:

Introduction - Accounting Multiple Services in a Single Supply - Recording Partial Payment to Suppliers -Outward Supplies - Recording Outward Supply with Additional Expenses - Supply of services -Business to consumers - Time of Supply of Services - Place of Supply of Services - Determining place of supply of services - Exempt Supply of Services under GST -Export Supply of Services - Reverse Charge on Services under GST - Advance Receipts from Customers under GST - Advance Receipt and issuing Invoice on same month -Advance Receipt and issuing Invoice on different month - Reversal of GST on account of cancellation of advance receipt - Generating GSTR- Report in ERP - Input Tax Credit Set Off - Migration to ERP - Activate Goods and Services Tax (GST) in ERP - Set up GST rates - Update Masters - Update party GSTIN/UIN - Creation of GST Duty ledgers.

SUGGESTED READINGS:

1. Taxmann's Basics of GST
2. Taxmann's GST: A practical Approach
3. Theory & Practice of GST, Srivathsala, HPH
4. Theory & Practice of GST: Dr. Ravi M.N, PBP.

Paper DSE 602(b) : FINANCIAL DECISION MAKING - II

Objective:*To make students to understand the Financial Decision Making.*

UNIT I: DECISION ANALYSIS:
Cost/volume/profit analysis: Breakeven analysis - Profit performance and alternative operating levels - Analysis of multiple products - Marginal Analysis: Sunk costs, opportunity costs and other related concepts - Marginal costs and marginal revenue - Special orders and pricing - Make versus buy - Sell or process further - Add or drop a segment - Capacity considerations

UNIT II: PRICING:
Pricing decisions: Pricing methodologies - Target costing - Elasticity of demand - Product life cycle considerations - Marketstructure considerations

UNIT III: RISK MANAGEMENT:
Enterprise Risk: Types of risk - Risk identification and assessment - Risk mitigation strategies - Managing risk

UNIT IV: INVESTMENT DECISIONS:
Capital budgeting process: Stages of capital budgeting - Incremental cash flows - Income tax considerations - Evaluating uncertainty - Capital investment method analysis: Net present value - Internal rate of return - Payback - Comparison of investment analysis methods

UNIT V: PROFESSIONAL ETHICS:
Business ethics: Moral philosophies and values - Ethical decision making - Ethical considerations for management accounting and financial management professionals: IMA's Statement of Ethical Professional Practice - Fraud triangle - Evaluation and resolution of ethical issues - Ethical considerations for the organization: Organizational factors and ethical culture - IMA's Statement on Management Accounting, "Values and Ethics: From Inception to Practice" - Ethical leadership - Legal compliance - Responsibility for ethical conduct - Sustainability and social responsibility.

SUGGESTED READINGS:
1. Wiley CMAexcel Learning System, Part 2: Strategic Financial Management
2. Cost Management: A Strategic Emphasis, 6th edition; Blocher, Edward, J., Stout, David E., Juras, Paul E., and Cokins, Gary; McGraw Hill
3. Horngreen's Cost Accounting: A Managerial Emphasis, 16th edition; Charles T., Datar, Srikant, and Rajan, Madhav; Pearson
4. Principles of Corporate Finance, 11th edition; Brealey, Richard, A., Myers, Stewart C., and Allen, Franklin; McGraw Hill
5. Fundamentals of Financial Management, 13th edition; Van Horn, James, C., and Wachowicz, John M. Jr.; FT / Prentice Hall
6. Enterprise Risk Management - Integrated Framework; COSO, The Committee of Sponsoring Organizations of the Treadway Commission, 2017

Paper DSE 602 (c) : INTERNATIONAL AUDITING

Objective:*To make students to understand the International Auditing.*

UNIT I: ETHICS, PROFESSIONAL RESPONSIBILITIES AND GENERAL AUDITING PRINCIPLES:

Introduction to Auditing: Generally Accepted Auditing Standards (GAAS) - International Standards of Auditing (ISA) - Ethics, independence and professional conduct: AICPA Code of Professional Conduct - Sarbanes-Oxley Act (SOX), 2002 - Public Company Accounting Oversights Board (PCAOB) - Securities & Exchange Commission (SEC) - International Standards - Engagement Understanding and Acceptance: Pre-Engagement Acceptance Activities - Engagement Letter - Auditor's communication with those charged with governance

Quality Control: Statements on Quality Control Standards (SQCS) - Elements of a System of Quality control

UNIT II: ASSESSING AUDIT RISK AND DEVELOPING A PLANNED RESPONSE:

Audit Risk: Inherent Risk - Control Risk - Detection Risk - Fraud Risk: Fraudulent financial reporting - Misappropriation of assets - Fraud risk factors - Auditor's consideration of fraud

Planning the Audit: Audit Strategy - Audit Plan - Internal Controls: Auditor's Consideration of Internal Control - Operating Cycles - Internal Control Reports and Communications

UNIT III: PERFORMING FURTHER PROCEDURES AND OBTAINING AUDIT EVIDENCE:

Audit Evidence: Management's Assertions - Sufficient & Appropriate Audit Evidence - Audit Evidence determined by Risk of Material Misstatement (RMM) - Substantive Procedures: Revenue cycle - Expenditure cycle - Production cycle - Payroll cycle - Investing cycle - Financing cycle - Opening Balances - Illegal Acts - Related Parties - Contingencies - Estimates & Fair Value Measurements - Subsequent Events - Omitted Procedures & Subsequent Discovery of Facts - Using the Work of Others - Evaluating Audit Findings - Audit Documentation - Management Representation Letter - Audit Sampling: Sampling Risks - Attributes Sampling - Classical Variables Sampling - Probability Proportional to Size (PPS) Sampling

UNIT IV: AUDIT REPORTING:

Audit Reports: Unmodified opinion - Unmodified Opinion with Emphasis-of-matter and/or Other-matter paragraph - Qualified Opinion - Adverse Opinion - Disclaimer of Opinion - Audit Reporting Considerations: Audit of Comparative financial statements - Supplementary Information - Audit of Group financial statements - Audit of Single financial statements & Specific financial statement elements, accounts or items - Audit of Special Purpose financial statements - Audit of financial statements prepared using financial reporting framework of another country

UNIT V: OTHER ENGAGEMENTS:

Accounting & Review Services: Preparation of financial statements - Compilation engagement - Review engagement - Attestation Engagements: Examination - Review - Agreed-upon Procedures - Governmental Auditing: Governmental Auditing Standards - Single Audit Act

SUGGESTED READINGS:

1. Miles CPA Review Concept Book: Auditing and Attestation, Miles Education
2. Wiley CPA Excel Exam Review Course Study Guide: Auditing and Attestation, Wiley
3. Wiley Practitioner's Guide to GAAS: Covering all SAS, SSAE's , SSARS, PCAOB, Auditing Standards, and Interpretations, Joanne M. Flood, Wiley
4. Auditing: A Risk Based-Approach to Conducting a Quality Audit, Karla M Johnstone, Audrey A. Gramling and Larry E. Rittenberg, Cengage Learning
5. Principles of Auditing & Other Assurance Services, Ray Whittington and Kurt Pany, McGraw Hill
6. Auditing & Assurance Services: A Systematic Approach, William F Messier Jr, Steven M. Glover and Douglas F. Prawitt, McGraw Hill.

Paper DSE 603(a) :MULTIMEDIA SYSTEMS

Hours Per Week: 7 (3T+4P) **Credits**: 5
Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective:*To acquire the knowledge of multimedia systems.*

UNIT-I: MEDIA AND DATA STREAMS:
Properties of multimedia systems, Data streams characteristics: Digital representation of audio, numeric instruments digital interface Bark concepts, Devices, Messages, Timing Standards Speech generation, analysis and transmission.

UNIT-II: DIGITAL IMAGE&ANIMATIONS:
Digital Image: Analysis, recognition, transmission, **Video**: Representation, Digitalization, transmission.
Animations: Basic concepts, animation languages, animations control transmission.

UNIT-III: DATA COMPRESSION STANDARDS&STORAGE:
Data Compression Standards: JPEG, H-261, MPEG DVI
Optical storage devices and Standards: WORHS, CDDA, CDROM, CDWO, CDMO.
Real Time Multimedia, Multimedia file System.

UNIT-IV: MULTIMEDIA COMMUNICATION SYSTEM, DATABASES&SYNCHRONIZATION:
Multimedia Communication System: Collaborative computing session management, transport subsystem, QOS, resource management.
Multimedia Databases: Characteristics, data structures, operation, integration in a database model.
Synchronization: Issues, presentation requirements, reference to multimedia synchronization, MHEG.

UNIT-V: MULTIMEDIA APPLICATION:
Media preparation, Composition, integration communication, consumption, entertainment.

SUGGESTED READINGS:

1. Ralf Steninmetz, KlaraHahrstedt, *Multimedia: Computing, Communication and Applications,* PHI PTR Innovative Technology Series.
2. John F.KoegelBufford, *Multimedia System,* Addison Wesley, 1994.
3. Mark Elsom – Cook, *Principles of Interactive Multimedia* , Tata Mc-Graw Hill, 2001.
4. Judith Jefcoate, *Multimedia in Practice: Technology and Application* , PHI 1998.

Paper DSE 603(b) :CYBER SECURITY

Hours Per Week: 7 (3T+4P) **Credits**: 5
Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective:*to understand the cyber security, detection, network security, the law and cyber forensic.*

UNIT-I: INTRODUCTION TO CYBER SECURITY, CYBER SECURITY VULNERABILITIES AND CYBER SECURITY SAFEGUARDS:

Introduction to Cyber Security: Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.

Cyber Security Vulnerabilities: Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness.

Cyber Security Safeguards: Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.

UNIT-II: SECURING WEB APPLICATION, SERVICES AND SERVERS:

Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

UNIT-III: INTRUSION DETECTION AND PREVENTION:

Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.

UNIT-IV: CRYPTOGRAPHY AND NETWORK SECURITY:

Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

UNIT-V: CYBERSPACE AND THE LAW, CYBER FORENSICS:

Cyberspace and The Law: Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.

Cyber Forensics: Introduction to Cyber Forensics, Handling Preliminary Investigations, Controlling an Investigation, Conducting disk-based analysis, Investigating Information-hiding, Scrutinizing E-mail, Validating E-mail header information, Tracing Internet access, Tracing memory in real-time.

SUGGESTED READINGS:

1. Ramandeepkaurnagra, Cyber laws and Intellectual Property Rights, Kalyani Publishers, 7e,
2. Nina Godbole&SunitBelapureCyber Security, Wiley India Pvt Ltd, 2012.
3. Gerald. R. Ferrera, Reder and linchtenstein, Cyber laws – Text and Cases,3e, Cengage learning
4. FaiyazAhamed, Cyber Law and Information Security, DreamTech Press, 2013
5. PankajAgarwal, Information Security and Cyber Laws, Acme Learning, 2013
6. Manjotkaur, Essentials of E-Business and Cyber laws, Kalyani Publishers.

Paper DSE 603(c) :DATA ANALYTICS

Hours Per Week: 7 (3T+4P) **Credits**: 5
Exam Hours: 1 ½ **Marks:** 50U+35P+15I

Objective: *To l*earn the different ways of data Analysis, data streams, mining and clustering and visualization.

UNIT-I: INTRODUCTION TO BIG DATA:
Introduction to Big Data Platform – Challenges of conventional systems – Web data – Evolution of Analytic scalability, analytic processes and tools, Analysis vs reporting – Modern data analytic tools, Stastical concepts: Sampling distributions, resampling, statistical inference, prediction error.

UNIT-II: DATA ANALYSIS:
Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynamics – Rule induction – Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods.

UNIT-III: MINING DATA STREAMS:
Introduction to Streams Concepts – Stream data model and architecture – Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window – Realtime Analytics Platform(RTAP) applications – case studies – real time sentiment analysis, stock market predictions.

UNIT-IV: FREQUENT ITEMSETS AND CLUSTERING:
Mining Frequent item sets – Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data – CLIQUE and PROCLUS – Frequent pattern based clustering methods – Clustering in non-euclidean space – Clustering for streams and Parallelism.

UNIT-V: FRAMEWORKS AND VISUALIZATION:
MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases – S3 – Hadoop Distributed file systems – Visualizations – Visual data analysis techniques, interaction techniques; Systems and applications:

SUGGESTED READINGS:

1) Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2) AnandRajaraman and Jeffrey David Ullman, Mining of Massive Datasets,Cambridge University Press, 2012.
3) Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analystics, John Wiley & sons, 2012.
4) Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O‟Reilly, 2011.
5) Jiawei Han, MichelineKamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.

TELANGANA STATE COUNCIL OF HIGHER EDUCATION

B.Sc. (Computer Science) Course Structure

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

CBCS Pattern in Semester System – 2019

Paper	Semester	Course Title	Hours / week		Credits
			Theory	Practical	
DSC – I	I	Programming in C	4	3	4 + 1 = 5
DSC – II	II	Programming in C++	4	3	4 + 1 = 5
DSC – III	III	Data Structures Using C++	4	3	4 + 1 = 5
DSC – IV	IV	Data Base Management Systems (DBMS)	4	3	4 + 1 = 5
DSC – V	V	Programming in Java	4	3	4 + 1 = 5
DSC – VI	VI	Web Technologies	4	3	4 + 1 = 5

Paper	Semester	Course Title	Hours / week		Credits
			Theory	Practical	
SEC – I	III	Python – I	2		2
SEC – II	III	Operating Systems - I	2		2
SEC – III	IV	Python – II	2		2
SEC – IV	IV	Operating Systems - II	2		2

Paper	Semester	Course Title	Hours / week		Credits
			Theory	Practical	
AECC	I	Fundamentals of Computer	2		2
AECC	II	Office Automation	2		2

Paper	Semester	Course Title	Hours / week		Credits
			Theory	Practical	
GENERAL ELECTIVE (GE)	IV	Information Technologies	4		4

PROJECT / OPTINAL

Paper	Semester	Course Title	Hours / week		Credits
			Theory	Practical	
PROJECT / OPTINAL	VI	PHP with MYSQL	3	3	3 + 1 = 4

Programming in C (Semester – I)

Theory: 4 Hrs/Wk (4 Credits)
Practical: 3 Hrs/Wk (1 Credit) **Total Credits: 4+1 = 5 Credits**

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: Pradip Dey, Manas Ghosh, Computer Fundamentals and Programming in C (2e)

Reference Books:

1. Ivor Horton, Beginning C
2. Ashok Kamthane, Programming in C
3. Herbert Schildt, The Complete Reference C
4. Paul Deitel, Harvey Deitel, C How To Program
5. Byron S. Gottfried, Theory and Problems of Programming with C
6. Brian W. Kernighan, Dennis M. Ritchie, The C Programming Language
7. B. A. Forouzan, R. F. Gilberg, A Structured Programming Approach Using C

C – Lab

Practical: 3 Hrs/Wk (1 Credits)

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 header file.
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:

1. Write the Pseudo Code and draw Flow Chart for the above programs.
2. Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows 10.

Programming in C++ (Semester – II)

Theory: 4 Hrs/Wk (4 Credits)
Practical: 3 Hrs/Wk (1 Credit) **Total Credits: 4+1 = 5 Credits**

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 Book: Tony Gaddis, Starting out with C++: from control structures through objects (7e)

References:

1. B. Lippman, C++ Primer
2. Bruce Eckel, Thinking in C++
3. K.R. Venugopal, Mastering C++
4. Herbert Schildt, C++: The Complete Reference
5. Bjarne Stroustrup, The C++ Programming Language
6. Sourav Sahay, Object Oriented Programming with C++

C++ – Lab

Practical: 3 Hrs/Wk (1 Credits)

1. Write a program to print the sum of digits of a given number.
2. Write a program to check whether the given number is Armstrong or not
3. Write a program to print the prime number from 2 to n where n is natural number given.
4. Write a program to find largest and smallest elements in a given list of numbers and sort the given list.
5. Write a program to read the student name, roll no, marks and display the same using class and object.
6. Write a program to implement the dynamic memory allocation and de-allocation using new and delete operators using class and object.
7. Write a program to find area of a rectangle, circle, and square using constructors.
8. Write a program to implement copy constructor.
9. Write a program using friend functions and friend class
10. Write a program to implement default Constructor.
11. Write a program to implement parameterized Constructor
12. Write a program to implement Copy Constructor
13. Write a program to define the constructor inside/outside of the class
14. Write a program to implement all three constructors within a single class as well as use multiple classes(individual classes)
15. Write a program to implement the following concepts using class and object
    a. Function overloading
    b. Operator overloading (unary/binary(+ and -))
16. Write a program to demonstrate single inheritance, multilevel inheritance and multiple inheritances.
17. Write a program to implement the overloaded constructors in inheritance.
18. Write a program to implement the polymorphism and the following concepts using class and object.
    a. Virtual functions
    b. Pure virtual functions
19. Write a program to implement the virtual concepts for following concepts
    a. Constructor (not applied)
    b. Destructor (applied)
20. Write a program to demonstrate static polymorphism using method overloading.
21. Write a program to demonstrate dynamic polymorphism using method overriding and dynamic method dispatch.
22. Write a program to implement the template (generic) concepts
    a. Without template class and object
    b. With template class and object

Note:

1. Write the Pseudo Code and draw Flow Chart for the above programs.
2. Recommended to use Open Source Software: GCC on Linux; DevC++ (or) CodeBlocks on Windows 10.

Data Structures using C++ (Semester – III)

Theory: 4 Hrs/Wk (4 Credits)
Practical: 3 Hrs/Wk (1 Credit) **Total Credits: 4+1 = 5 Credits**

UNIT – I

Basic data Structure: Introduction to Data Structures, Types of Data Structures, and Introduction to Algorithms, Pseudo code, and Relationship among data, data structures, and algorithms, Implementation of data structures, Analysis of Algorithms.

Stacks: Concept of Stacks and Queues, Stacks, Stack Abstract Data Type, Representation of Stacks Using Sequential Organization (Arrays), Multiple Stacks, Applications of Stack, Expression Evaluation and Conversion, Polish notation and expression conversion, Processing of Function Calls, Reversing a String with a Stack, Recursion.

UNIT – II

Recursion: Introduction, Recurrence, Use of Stack in Recursion, Variants of Recursion, Recursive Functions, Iteration versus Recursion.

Queues: Concept of Queues, Queue as Abstract Data Type, Realization of Queues Using Arrays, Circular Queue, Multi-queues, Dequeue, Priority Queue, Applications of Queues,

Linked Lists: Introduction, Linked List, Linked List Abstract Data Type, Linked List Variants, Doubly Linked List, Circular Linked List, Representation of Sparse Matrix Using Linked List, Linked Stack, Linked Queue.

UNIT – III

Trees: Introduction, Types of Trees, Binary Tree, Binary Tree Abstract Data Type, Realization of a Binary Tree, Insertion of a Node in Binary Tree, Binary Tree Traversal, Other Tree Operations, Binary Search Tree, Threaded Binary Tree, Applications of Binary Trees.

Searching and Sorting: Search Techniques-Linear Search, Binary Search, Sorting Techniques-Selection Sort, Bubble Sort, Insertion Sort, Merge Sort, Quick Sort, Comparison of All Sorting Methods, Search Trees: Symbol Table, Optimal Binary Search Tree, AVL Tree (Height-balanced Tree).

UNIT – IV

Graphs: Introduction, Representation of Graphs, Graph Traversal – Depth First Search, Breadth First Search, Spanning Tree, Prim's Algorithm, Kruskal's Algorithm.

Hashing: Introduction, Key Terms and Issues, Hash Functions, Collision Resolution Strategies, Hash Table Overflow, Extendible Hashing

Heaps: Basic Concepts, Implementation of Heap, Heap as Abstract Data Type, Heap Sort, Heap Applications.

Text Book:

1. Varsha H. Patil "Data structures using C++" Oxford University press, 2012
2. M.T. Goodrich, R. Tamassia and D. Mount, Data Structures and Algorithms in C++, John Wiley and Sons, Inc., 2011.

References:

1. Adam Drozdek "Data structures and algorithm in C++" Second edition, 2001
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, Introduction to Algorithms,2nd Ed., Prentice-Hall of India, 2006.
3. Robert L. Kruse and A.J. Ryba, Data Structures and Program Design in C++, PrenticeHall, Inc., NJ, 1998.
4. B. Stroupstrup, The C++ Programming Language, Addison Wesley, 2004
5. D.E. Knuth, Fundamental Algorithms (Vol. I), Addison Wesley, 1997

Data Structures using C++ – Lab

Practical: 3 Hrs/Wk (1 Credits)

1. Write C++ programs to implement the following using an array
   a) Stack ADT b) Queue ADT
2. Write a C++ program to implement Circular queue using array.
3. Write C++ programs to implement the following using a single linked list.
   a) Stack ADT b) Queue ADT
4. Write a C++ program to implement Circular queue using Single linked list.
5. Write a C++ program to implement the double ended queue ADT using double linked list.
6. Write a C++ program to solve tower of Hanoi problem recursively
7. Write C++ program to perform the following operations:
   a) Insert an element into a binary search tree.
   b) Delete an element from binary search tree.
   c) Search for a key in a binary search tree.
8. Write C++ programs for the implementation tree traversal technique BFS.
9. Write a C++ program that uses recursive functions to traverse a binary search tree.
   a) Pre-order b) In-order c) Post-order
10. Write a C++ program to find height of a tree.
11 Write a C++ program to find MIN and MAX element of a BST.
12 Write a C++ program to find Inorder Successor of a given node.
13. Write C++ programs to perform the following operations on B-Trees and AVL Trees.
   a) Insertion b) Deletion
14 Write C++ programs for sorting a given list of elements in ascending order using the following sorting methods.
   a) Quick sort b) Merge sort
15. Write a C++ program to find optimal ordering of matrix multiplication.
16. Write a C++ program that uses dynamic programming algorithm to solve the optimal binary search tree problem
17. Write a C++ program to implement Hash Table
18. Write C++ programs to perform the following on Heap
   a) Build Heap b) Insertion c) Deletion
19. Write C++ programs to perform following operations on Skip List
   a) Insertion b) Deletion
20. Write a C++ Program to Create a Graph using Adjacency Matrix Representation.
21. Write a C++ program to implement graph traversal techniques
   a) BFS b) DFS
22. Write a C++ program to Heap sort using tree structure.

Note:

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
- In the external lab examination student has to execute two programs with compilation and deployment steps are necessary.
- External Vice-Voce is compulsory.

Data Base Management Systems (Semester – IV)

Theory: 4 Hrs/Wk (4 Credits)
Practical: 3 Hrs/Wk (1 Credit) **Total Credits: 4+1 = 5 Credits**

UNIT – I

Introduction: Database-System Applications, Purpose of Database Systems, View of Data, Database Languages, Relational Databases, Database Design, Data Storage and Querying, Transaction Management, Database Architecture, Database Users and Administrators.
Introduction to the Relational Model: Structure of Relational Databases, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

UNIT – II

Database Design and the E-R Model: Overview of the Design Process, The Entity- Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas, Entity-Relationship Design Issues, Extended E-R Features, Alternative Notations for Modeling Data, Other Aspects of Database Design.
Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional- Dependency Theory, Decomposition Using Multivalued Dependencies, Normal Forms-2 NF, 3 NF, BCNF, The Database Design Methodology for Relational Databases.

UNIT – III

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database.
Intermediate SQL: Join Expressions, Views, Transactions, Integrity Constraints, SQL Data Types and Schemas, Authorization.
Advanced SQL: Accessing SQL from a Programming Language, Functions and Procedures, Triggers, Recursive Queries.

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:

1. Silberschatz, H. Korth and S. Sudarshan, Database System Concepts, 6th Ed., Tata McGraw Hill, 2011
2. Thomas M. Connolly, Carolyn E. Begg, Database Systems–A Practical Approach to Design, Implementation, and Management (6e)

Data Base Management Systems – Lab

Practical: 3 Hrs/Wk (1 Credits)

1. Create a database having two tables with the specified fields, to computerize a library system of a University College.

   LibraryBooks (Accession number, Title, Author, Department, PurchaseDate, Price),
   IssuedBooks (Accession number, Borrower)

   a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
   b) Delete the record of book titled "Database System Concepts".
   c) Change the Department of the book titled "Discrete Maths" to "CS".
   d) List all books that belong to "CS" department.
   e) List all books that belong to "CS" department and are written by author "Navathe".
   f) List all computer (Department="CS") that have been issued.
   g) List all books which have a price less than 500 or purchased between "01/01/1999" and "01/01/2004".

2. Create a database having three tables to store the details of students of Computer Department in your college.

   Personal information about Student (College roll number, Name of student, Date of birth, Address, Marks(rounded off to whole number) in percentage at 10 + 2, Phone number)
   Paper Details (Paper code, Name of the Paper)
   Student's Academic and Attendance details (College roll number, Paper Code, Attendance, Marks in home examination).

   a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
   b) Design a query that will return the records (from the second table) along with the name of student from the first table, related to students who have more than 75% attendance and more than 60% marks in paper2.
   c) List all students who live in "Warangal" and have marks greater than 60 in paper1.
   d) Find the total attendance and total marks obtained by each student.
   e) List the name of student who has got the highest marks in paper2.

3. Create the following tables and answer the queries given below:

   Customer (CustID, email, Name, Phone, ReferrerID)
   Bicycle (BicycleID, DatePurchased, Color, CustID, ModelNo)
   BicycleModel(ModelNo, Manufacturer, Style)
   Service (StartDate, BicycleID, EndDate)

   a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
   b) List all the customers who have the bicycles manufactured by manufacturer "Honda".
   c) List the bicycles purchased by the customers who have been referred by Customer "C1".
   d) List the manufacturer of red colored bicycles.
   e) List the models of the bicycles given for service.

4. Create the following tables, enter at least 5 records in each table and answer the queries given below.

   Employee (Person_Name, Street, City)
   Works (Person_Name, Company_Name, Salary)
   Company (Company_Name, City)
   Manages (Person_Name, Manager_Name)

a) Identify primary and foreign keys.
b) Alter table employee, add a column "email" of type varchar(20).
c) Find the name of all managers who work for both Samba Bank and NCB Bank.
d) Find the names, street address and cities of residence and salary of all employees who work for "Samba Bank" and earn more than $10,000.
e) Find the names of all employees who live in the same city as the company for which they work.
f) Find the highest salary, lowest salary and average salary paid by each company.
g) Find the sum of salary and number of employees in each company.
h) Find the name of the company that pays highest salary.

5. Create the following tables, enter at least 5 records in each table and answer the queries given below.
   Suppliers (SNo, Sname, Status, SCity)
   Parts (PNo, Pname, Colour, Weight, City)
   Project (JNo, Jname,Jcity)
   Shipment (Sno, Pno, Jno, Qunatity)

   a) Identify primary and foreign keys.
   b) Get supplier numbers for suppliers in Paris with status>20.
   c) Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.
   d) Get suppliers names for suppliers who do not supply part P2.
   e) For each shipment get full shipment details, including total shipment weights.
   f) Get all the shipments where the quantity is in the range 300 to 750 inclusive.
   g) Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.
   h) Get the names of cities that store more than five red parts.
   i) Get full details of parts supplied by a supplier in Hyderabad.
   j) Get part numbers for part supplied by a supplier in Warangal to a project in Chennai.
   k) Get the total number of project supplied by a supplier (say, S1).
   l) Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).

6. Write a PL/SQL Program to demonstrate Procedure.
7. Write a PL/SQL Program to demonstrate Function.
8. Write a PL/SQL program to Handle Exceptions.
9. Write a PL/SQL Program to perform a set of DML Operations.
10. Create a View using PL/SQL program.
11. Write a PL/SQL Program on Statement Level Trigger.
12. Write a PL/SQL Program on Row Level Trigger.

Note:

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
- In the external lab examination student has to execute two programs with compilation and deployment steps are necessary.
- External Vice-Voce is compulsory.

Programming in Java (Semester – V)

Theory: 4 Hrs/Wk (4 Credits)
Practical: 3 Hrs/Wk (1 Credit) **Total Credits: 4+1 = 5 Credits**

UNIT - I

Introduction: Java Essentials, JVM, Java Features, Creation and Execution of Programs, Data Types, Structure of Java Program, Type Casting, Conditional Statements, Loops, Classes, Objects, Class Declaration, Creating Objects.

UNIT - II

Method Declaration and Invocation, Method Overloading, Constructors – Parameterized Constructors, Constructor Overloading, Cleaning-up unused Objects. Class Variables &Method-static Keyword, this Keyword, One-Dimensional Arrays, Two-Dimensional Arrays, Command-Line Arguments, Inner Class.

Inheritance: Introduction, Types of Inheritance, extends Keyword, Examples, Method Overriding, super, final Keyword, Abstract classes, Interfaces, Abstract Classes Verses Interfaces.

Packages: Creating and Using Packages, Access Protection, Wrapper Classes, String Class, StringBuffer Class.

UNIT - III

Exception: Introduction, Types, Exception Handling Techniques, User-Defined Exception.

Multithreading: Introduction, Main Thread and Creation of New Threads –By Inheriting the Thread Class or Implementing the Runnable Interface, Thread Lifecycle, Thread Priority and Synchronization.

Input/Output: Introduction, java.io Package, File Streams, FileInputStream Class, FileOutputStream Class, Scanner Class, BufferedInputStream Class, BufferedOutputStream Class, RandomAccessFile Class.

UNIT - IV

Applets: Introduction, Example, Life Cycle, Applet Class, Common Methods Used in Displaying the Output (Graphics Class).

Event Handling: Introduction, Types of Events, Example.

AWT: Introduction, Components, Containers, Button, Label, Checkbox, Radio Buttons, Container Class, Layouts.

Swings: Introduction, Differences between Swing and AWT, JFrame, JApplet, JPanel, Components in Swings, Layout Managers, JTable.

Text Book:

1. Sachin Malhotra, SaurabhChoudhary, Programming in Java (2e)

References:

1. Bruce Eckel, Thinking in Java (4e)
2. Herbert Schildt, Java: The Complete Reference (9e)
3. Y. Daniel Liang, Introduction to Java Programming (10e)
4. Paul Deitel, Harvey Deitel, Java: How To Program (10e)
5. Cay S. Horsttnann, Core Java Volume I –Fundamentals (10e)

Programming in Java – Lab

Practical: 3 Hrs/Wk (1 Credits)

1. Write a program to find the largest of n natural numbers.
2. Write a program to find whether a given number is prime or not.
3. Write a menu driven program for following:
    a. Display a Fibonacci series
    b. Compute Factorial of a number
4. Write a program to check whether a given number is odd or even.
5. Write a program to check whether a given string is palindrome or not.
6. Write a program to print the sum and product of digits of an Integer and reverse the Integer.
7. Write a program to create an array of 10 integers. Accept values from the user in that Array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
8. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
9. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
10. Write java program for the following matrix operations:
    a. Addition of two matrices
    b. Transposeof a matrix
11. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
12. Write a Java program for the implementation of multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
13. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
14. Write a java program to draw a line between two coordinates in a window.
15. Write a java program to display the following graphics in an applet window.
    a. Rectangles b. Circles
    c. Ellipses d. Arcs e. Polygons
16. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by NumberFormatException object. After that ex.getMessage () prints the information about the error occurring causes.
17. Write a program for the following string operations:
    a. Compare two strings b. concatenate two strings c. Compute length of a string
18. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

Note:

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
- In the external lab examination student has to execute two programs with compilation and deployment steps are necessary.
- External Vice-Voce is compulsory.

Web Technologies (Semester – VI)

Theory: 4 Hrs/Wk (4 Credits)
Practical: 3 Hrs/Wk (1 Credit) **Total Credits: 4+1 = 5 Credits**

UNIT – I

Introduction To XHTML: Introduction, first HTML, Headings, Linking, Images, special characters and horizontal rules, Lists, Tables, Frames, Forms, internal linking, meta Elements. CASCADING STYLE SHEETS – Introduction, Inline Styles, Embedded Style Sheets, Conflicting Styles, Linking external sheets, position Elements, box model and text flow, media types, building a CSS drop-down menu, user style sheets, CSS3.

UNIT – II

Introduction To Java Scripting: Introduction, simple program, prompt dialog and alert boxes, memory concepts, operators, decision making, control structures, if… else statement, while, counter-controlled repetitions, switch statement, do… while statement, *break* and *continue* statements. Functions – program modules in JavaScript, programmer–defined functions, functions definition, scope rules, global functions, Recursion.

UNIT – III

Arrays: Introduction, declaring and allocating arrays, references and reference parameters, passing arrays to functions. Multidimensional arrays, **EVENTS**–registering event handling, event onload, onmouseover, onmouseout, onfocus, onblur,onsubmit, onreset, event bubbling, more events. **JAVA SCRIPT OBJECTS** – introduction to object technology, Math Object, String Object, Date Object, Boolean and Number Object, document and window Objects, using cookies.

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 XMLHttpRequest object, XML and DOM, creating full scale Ajax-enabled application, Dojo Toolkit.

Text Book:

1. Internet & World Wide Web: HOW TO PROGRAM- H. M. Deitel, P.J. Deitel, -Fourth Edition- Pearson edition.

Web Technologies – Lab

Practical: 3 Hrs/Wk (1 Credits)

1. Write a HTML program using basic text formatting tags, <p>, <br>, <pre>.
2. Write a HTML program by using text formatting tags.
3. Write a HTML program using presentational element tags <b>, <i>, <strike>, <sup>, <sub>, <big>, <small>, <hr>
4. Write a HTML program using phrase element tags <blockquote>, <cite>, <abbr>, <acronym>, <kbd>, <address>
5. Write a HTML program using different list types.
6. Create a HTML page that displays ingredients and instructions to prepare a recipe.
7. Write a HTML program using grouping elements and .
8. Write a HTML Menu page for Example cafe site.
9. Write a HTML program using images, audios, videos.
10. Write a HTML program to create your time table.
11. 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.
12. Write a HTML program to create frames and links between frames.
13. Write a HTML program to create different types of style sheets.
14. Write a HTML program to create CSS on links, lists, tables and generated content.
15. Write a HTML program to create your college web site using multi column layouts.
16. Write a HTML program to create your college web site using for mobile device.
17. Write a HTML program to create login form and verify username and password.
18. Write a JavaScript program to calculate area of rectangle using function.
19. Write a JavaScript program to wish good morning, good afternoon, good evening depending on the current time.
20. Write a JavaScript program using switch case?
21. Write a JavaScript program to print multiplication table of given number using loop.
22. Write a JavaScript programs using any 5 events.
23. Write a JavaScript program using JavaScript built in objects.
24. Write a JavaScript program to create registration Form with Validations.
25. Write a XML Program to represent Student Data using DTD.
26. Write a XML Program to represent Data using XML Schema Definition.

Fundamental of Computers (Semester – I)

Theory: 2 Hrs/Wk **AECC** **Total Credits: 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:

Reema Thareja, Fundamentals of Computers.

References:

1. V.Rajaraman, 6th Edition Fundamentals of Computers, Neeharika Adabala.
2. Anita Goel, Computer Fundamentals.

Office Automation (Semester – II)

Theory: 2 Hrs/Wk **AECC** **Total Credits: 2 Credits**

UNIT-I

MS-Office: Introduction to MS-Office, MS-Word: Word Basics, working with formatted text, Shortcut keys, Formatting documents: Selecting text, Copying & moving data, Formatting characters, changing cases, Paragraph formatting, Indents, Drop Caps, Using format painter, Page formatting, Header & footer, Bullets & numbering, Tabs, Forming tables. Finding & replacing text, go to (F5) command, proofing text (Spell check, Auto correct), Reversing actions, Macros, Inserting pictures, Hyperlinks, Mail merging, Printing documents.

UNIT-II

Spreadsheets, workbooks, creating, saving & editing a workbook, Renaming sheet, cell entries (numbers, labels, and formulas), spell check, find and replace, Adding and deleting rows and columns Filling series, fill with drag, data sort, Formatting worksheet, Functions and its parts, Some useful Functions in excel (SUM, AVERAGE, COUNT, MAX, MIN, IF), Cell referencing (Relative, Absolute, Mixed), What-if analysis Introduction to charts: types of charts, creation of charts, printing a chart, printing worksheet.

Presentation Software, Uses, Presentation tips, components of slide, templates and wizards, using template, choosing an auto layout, using outlines, adding subheadings, editing text, formatting text, using master slide, adding slides, changing color scheme, changing background and shading, adding header and footer, adding clip arts and auto shapes. Various presentation, Working in slide sorter view (deleting, duplicating, rearranging slides), adding transition and animations to slide show, inserting music or sound on a slide, viewing slide show, Printing slides.

Text Book:

1. Computer Fundamentals – P.K. Sinha.
2. Introduction to Computers – N. Subramanian.
3. Introduction to Computers – Peter Norton Mcgraw Hill.
4. Fundamentals of Computers, by RemaTharaja, Oxford University Press India, 2014.
5. MS–Office _ BPB Publications.

Python - I (Semester – III)

Theory: 2 Hrs/Wk **SEC – I** **Total Credits: 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 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. James Payne, Beginning Python using Python 2.6 and Python 3
4. Charles Dierach, Introduction to Computer Science using Python
5. Paul Gries, Practical Programming: An Introduction to Computer Science using Python 3

Operating Systems - I (Semester – III)

Theory: 2 Hrs/Wk **SEC – II** **Total Credits: 2 Credits**

UNIT - I

Operating System: Introduction, The Operating System As A Resource Manager, History Of Operating Systems, The Operating System Zoo(Classifications), Operating System Concepts, System Calls, Operating System Structure(Architecture).

PROCESS: Creation, Hierarchies, States, THREADS- Usage, The Classical Thread Model, POSIX Threads, Pop-Up Threads.

UNIT - II

Scheduling: Introduction, Scheduling in Batch Systems, Scheduling in Interactive Systems, Scheduling in Real-Time Systems, Policy versus Mechanism, Thread Scheduling.

Memory Management: No Memory Abstraction, Memory Abstraction-Address Spaces, Virtual Memory, Page Replacement Algorithms, Design Issues for Paging Systems, Segmentation.

Text book:

1. A.S. Tanenbaum, and Herbert Bos, "Modern Operating Systems", 4th Ed., Prentice-Hall of India, 2015.

References:

1. William Stallings, Operating Systems: Internals and Design Principles, 5th Ed., Prentice-Hall of India, 2006.
2. Gary Nutt, Operating Systems: A Modern Approach, 3rd Ed., Addison Wesley, 2004.
3. D.M. Dhamdhere, Operating Systems: A Concept Based Approach, 2nd Ed., Tata McGraw-Hill, 2007.

Python - II (Semester – IV)

Theory: 2 Hrs/Wk **SEC – III** **Total Credits: 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. James Payne, Beginning Python using Python 2.6 and Python 3
4. Charles Dierach, Introduction to Computer Science using Python
5. Paul Gries, Practical Programming: An Introduction to Computer Science using Python 3

Operating Systems - II (Semester – IV)

Theory: 2 Hrs/Wk **SEC – IV** **Total Credits: 2 Credits**

UNIT - I

FILE SYSTEMS: Files, Directories, File System Implementation, File-SystemManagement and Optimization, Example File Systems.

INPUT/OUTPUT: Principles Of I/O Hardware, Principles Of I/O Software, I/O Software Layers, Disks, Clocks, User Interfaces: Keyboard, Mouse, Monitor, Thin Clients, Power Management.

UNIT- II

DEADLOCKS: Resources, Introduction to Deadlocks, Deadlock Detection and Recovery, Deadlock Avoidance, Deadlock Prevention.

SECURITY: The Security Environment, Operating Systems Security, Formal Models ofSecure Systems, Authentication, Insider Attacks, Malware, Defenses.

Text book:

1. A.S. Tanenbaum, and Herbert Bos, "Modern Operating Systems", 4th Ed., Prentice- Hall of India, 2015.

References:

1. William Stallings, Operating Systems: Internals and Design Principles, 5th Ed., Prentice-Hall of India, 2006.
2. Gary Nutt, Operating Systems: A Modern Approach, 3rd Ed., Addison Wesley, 2004.
3. D.M. Dhamdhere, Operating Systems: A Concept Based Approach, 2nd Ed., Tata McGraw-Hill, 2007.

Information Technologies (Semester – IV)

Theory: 4 Hrs/Wk **General Elective** **Total Credits: 4 Credits**

UNIT – I

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.

Introduction to Emerging Computer Technologies: Distributed Networking, Peer-to-peer Computing, Grid Computing, Cloud Computing, Utility Computing, On-demand Computing, Wireless Network, Bluetooth, Artificial Intelligence.

UNIT – II

Email: Functions of Email, Browser, Web Browser, Internet Service Providers.

Introduction to Information Security: Need for Information Security, Threats to Information Systems, Information Assurance, Cyber Security.

Introduction to Application Security and Counter Measures: Introduction to Application Security, Data Security Considerations, Security Technologies, Security Threats, Security Threats to E-Commerce, E-Cash and Electronic Payment System.

UNIT – III

Introduction to Security Measures: Secure Information System Development Application Development Security Information Security Governance and Risk Management , Security Architecture and Design Security Issues in Hardware, Data Storage, and Downloadable Devices , Physical Security of IT Assets Backup Security Measures

UNIT – IV

Introduction to Security Policies and Cyber Laws: Need for an Information Security Policy, Information Security Standards – ISO, Introducing Various Security Policies and Their Review Process , Introduction to Indian Cyber Law Objective and Scope of the IT Act, 2000, Intellectual Property Issues, Overview of Intellectual-Property- Related Legislation in India, Patent, Copyright Law Related to Semiconductor Layout and Design , Software Licence

Text Books:

Dr. Surya Prakash T, Ritendra G, Praveen Kumar S, KLSI, Introduction to Information Security and Cyber Laws (Dreamtech Publication)

PHP with MYSQL (Semester – VI) – (PROJECT / OPTINAL)

Theory: 4 Hrs/Wk (3 Credits)
Practical: 3 Hrs/Wk (1 Credit) **Total Credits: 3+1= 4 Credits**

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 with HTML. 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,

UNIT – II

Creating Function, Reading Data in Web pages: setting up web pages to communicate with PHP, Handling Text Fields, Text Areas, Checkboxes, Radio Buttons, List Boxes, Password Controls, Image Maps, File Uploads, Buttons, and PHP Browser.
Object oriented programming: creating Classes and objects, setting access to properties and methods, constructors, destructors, Inheritance, overriding and overloading methods, auto loading classes.

UNIT – III

Advanced OOP: Static members and inheritance, Abstract classes, Interfaces, object iteration, comparing objects, class constants, final keyword, reflection.
File Handling: fopen, feof, fgets, closing a file, fgetc, file_get_contents, reading a file into an array with file, file_exists, filesize, fread, fscanf, parse_ini_file, stat, fseek, copy, unlink, fwrite, reading and writing binary files, appending a file, file_put_contents, locking files

UNIT – IV

Introducing Databases and SQL: Deciding How to Store Data, Understanding Relational Databases, Setting Up MySQL, A Quick Play with MySQL, Connecting MySQL from PHP. Retrieving Data from MySQL with PHP, Retrieving Data with SELECT, Creating a Member Record Viewer. Manipulating MySQL Data with PHP – Inserting, Updating, and Deleting Records, Building a Member Registration Application. Sessions, Cookies and FTP.

Text Books:

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.
2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.

PHP with MYYSQL – Lab

Practical: 3 Hrs/Wk (1 Credit)

1. Write a PHP script to display the Fibonacci sequence with HTML page.
2. Write a PHP script to create a chess board.
3. Write a PHP script using built-in string function like strstr(), strops(), substr_count(), etc...
4. Write a PHP script to transform a string to uppercase, lowercase letters, make a string's first Character uppercase.
5. Write a PHP script to count number of elements in an array and display a range of array elements.
6. Write a PHP script using a function to display the entered string in reverse.
7. Write a PHP script to demonstrate inheritance.
8. Write a PHP script to demonstrate the object overloading with _get(), _set(), and _call().
9. Write a PHP script to demonstrate the method overloading and method overriding mechanisms.
10. Write a PHP script to demonstrate the use of final classes and final methods.
11. Write a PHP script to demonstrate the use of interfaces.
12. Write a PHP script using constructors and destructors.
13. Write a PHP application to handling HTML forms with PHP script.
14. Write a PHP script to create a file, write data into file and display the file's data.
15. Write a PHP script to check and change file permissions, copying, renaming and deleting files.
16. Write a PHP application for connecting to MySQL and reading data from database table.
17. Write a PHP application for inserting, updating, deleting records in the database table.
18. Develop a PHP application for student registration form.
19. Develop a PHP application for creating, updating, reading and deleting the Student records from MYSQL Database.

Note:

- Programs of all the Concepts from Text Book including exercises must be practice and execute.
- External Vice-Voce is compulsory.

B.Sc. (Computer Science)

Model Question Paper (4 – Credits)

Time : 3 Hours **Max Marks : 80**

PART -A

Answer any EIGHT questions in part –A **8 x 4 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 **12 x 4 = 48 Marks**

UNIT- I

13
OR
14

UNIT- II

15
OR
16

UNIT- III

17
OR
18

UNIT- IV

19
OR
20

B.Sc. (Computer Science)

Practical Question Paper (1 – Credit)

Time: 3 Hours **Max Marks: 25**

Answer any TWO questions (15 Marks)

UNIT – I	1 Program
UNIT – II	1 Program
UNIT – III	1 Program
UNIT – IV	1 Program

Viva – 5 Marks

Record – 5 Marks

BA Political Science

Courses offered under CBCS system from 2019-20 onwards as per TSCHE guidelines (Applicable to all the Telangana State Universities)

Discipline specific courses (DSC)

1st Semester
Understanding Political Theory

IInd Semester
Western Political Thought

IIIrd Semester
Indian Political Thought

IV th Semester
Constitution and Politics of India

Discipline specific Electives (DSE)

Vth Semester
I. International Relations
Or
II. Government and Politics in Telangana

VI Semester
I. Global Politics
Or
II . Contemporary social movements

Generic Elective (GE)

Vth Semester
Politics of Development

Project Work / Optional Paper

VI the Semester
Contemporary Political Theory

B.A Political Science

I st Semester

Paper - I

Understanding Political Theory

Unit- I Political Theory

- What is Political Theory, Evolution, Nature , Significance
- Debates on Political Theory

  a)Normative b) Empirical

Unit-II What is Political?

- State: Theories of origin of the state, Divine, Social Contract, Evolution Theories
- Power and Authority
- Authoritative allocation of Values
- Sovereign state : Challenges

Unit- III Political Values and Theoretical Perspective

- Liberty :- A) Liberal B) Marxist C) Feminist
- Equality :- A) Liberal B) Marxist C) Feminist
- Justice :- A) Liberal B) Marxist C) Feminist

Unit-IV Political Ideologies

- Liberalism
- Nationalism
- Multiculturalism

Unit-V Political Institutions and Functions

- Legislature, Executive and Judiciary
- Political Parties, Pressure Groups, Media

Reading list : -

1. Rajeev Bhargava & Ashok Acharya , editions , Political Theory : An Introduction , Pearson ,2019
2. Sushila Ramaswamy, Political Theory : Ideas and Concept , PHI Learning Pvt , Ltd .2015
3. O.P. Gauba, An Introduction to Political Theory , Macmillan, 2019
4. Michael G. Roskin , Robert L. Cord, James A. Medeiros , Walter S. Jones , Political Science : An Introduction , Pearson ,2018
5. Hoveyda Abbas , Ranjay Kumar , Political Theory , Pearson ,2019
6. John Hottman , Paul Graham , Introduction to Political Ideologies , Pearson ,2014
7. A. *Appadorai, (2000), Substance of Politics, Oxford University Press, New Delhi, India.*
8. George H Sabine, Thomas L Thorson, (1973), A History of Political Theory, Oxford & IBH Publishing Co., New Delhi.
9. Heywood, Andrew, (2012) Political Ideologies: An Introduction, Palgrave Macmillan, UK.
10. Heywood, Andrew, (2013), Politics, Palgrave Macmillan (UK).
11. Leon P. Baradat, (2011), Political Ideologies, Routledge.
12. Michael Freeden, Lyman Tower Sargent, Marc Stears,(eds) (2013), The Oxford Handbook of Political Ideologies, Oxford University Press, UK.
13. Ernest Barker : Principles of Social and Political Theory (London , Oxford University Press 1951)
14. Norman P. Barry : An Introduction to Modern Political Theory (London Macmillan, 1989)
15. Richard Bellamy (ed) : Theories and Concepts of Politics (New York , Manchester University Press 1993.)
16. Anthoppny H. Brirch : The Concepts and Theories of Modern Democracy (London , Routledge ,2001)
17. Martin Carnoy : The State and Political Theory (Princeton , Princeton University Press , 1984)

B.A Political Science

II st Semester

Paper - II

Western Political Thought

Unit- I Greek Political Thought

- Greek Political Thought – Sophists
- Plato:- Concept of Justice , Ideal State , Education and Communism.
- Aristotle :- Forms of Governments, On revolution , Slavery , Best state

Unit- II : Medieval and Early Modern Thought

- Thomas Aquinas :- Theory of Laws, Christianized Aristotle
- Church – State Controversy
- Niccolo Machiavelli – Human Nature , StateCraft

Unit- III Social Contractualists

- Thomas Hobbes :- Individualism and Absolute (State) Sovereignty
- John Locke :- Natural Rights Limited Government
- J. J. Rousseau :- Romanticism, General will , Popular Sovereignty

Unit- IV : Utilitarian Thought

- Jeremy Bentham :- Utilitarian Principles; Hedonism
- J. S. Mill :- On liberty , Representative Government

Unit- V : Philosophy of Dialectics

- G.W. F. Hegal :- Dialectics Purpose of History Geist (Spirt) and State
- Karl Marx:- Historical Materialism, Class war and Revolution.

Reading list :

1. . D.Mackenzie Brown, (1959), Indian Political Thought from Manu to Gandhi., University of California Press, Berleley and Los Angeles.
2. George Klosko, (eds), (2011), The Oxford Handbook of The History of Political Philosophy, Oxford University Press, New York.
3. Gregory Claeys, (eds)(2013), Encyclopedia of Modern Political Thought, Sage Publication, New Delhi.
4. M.P.Singh and Himanshu Roy, (eds), (2011), Indian Political Thought: Themes and Thinkers, Pearson, New Delhi.
5. N.D.Arora and S.S.Awasthy, (2007), Political Theory and Political Thought, Har-Anand Publications, New Delhi.
6. S.K.Sarma and Urmila Sharma, (2006), Western Political Thought (from Plato to Burke), Atlantic Publishers, New Delhi.
7. Subrata Mukherjee & Sushila Ramaswamy, (2011), A History of Political Thought,: Plato to Marx, PHI Learning Private Limited, New Delhi.
8. Thomas Pantham, Kenneth L. Deutsch, (1986), Political Thought in Modern India, Sage Publication, New Delhi.

B.A Political Science

III rd Semester

Paper - III

Indian Political Thought

Unit- I State and Society in Ancient India

- Manu – Features of Manusmriti, Origins of Varna, Varna Dharma
- Buddha – Dhamma , Sangha , Eightfold path
- Kautilya- Saptanga Theory , Mandala Theory , Statecraft

Unit-II Medieval Political Thought

- Basava- Anubhava Mantapa , Gender Equality
- Ziauddin Barani- Theory of Kingship (Ideal Sulthan) , Ideal Polity

Unit- III RenaissanceThought

- Raja Ram Mohan Roy - Colonial Encounters , Brahma Samaj
- Jyothi Rao Phule- Gulam Giri , Satya Shodhak Samaj , Education

Unit-IV Reformist Thought

- M. K. Gandhi – Satyagraha , Trusteeship , Problem of Political Obligation
- Dr. B. R. Ambedkar- Who are Shudras ? , Annihilation of Caste

Unit-V Socialist Thought

- M.N. Roy- Radical Humanism
- Jawaharlal Nehru- Democratic Socialism
- R.M. Lohia – Concept of Four Pillars of State(Chaukhamba Model)

B.A Political Science

IV th Semester

Paper - IV

Constitution and Politics of India

Unit- I Constitutional Development in India

- Brief overview of Nationalist Movement
- Evolution of Indian Constitution -1909 Act ,1919 Act ,1935Act.
- Philosophical Foundations of the Indian Constitution – Liberal, Gandhian, Socialist

Unit- II : Institutional Framework

- Union Government – Executive; Legislature; Judiciary
- State Government - Executive; Legislature; Judiciary

Unit- III Federal Politics

- Union- State Relations : Legislative, Administrative, Financial
- Recent trends in Union - State Relations

Unit- IV : Electoral Politics in India

- Political Parties a) National : INC, BJP, CPM, BSP
  b) Regional : DMK, Akali Dal, TDP, TRS
  c) Recent Trends in Party System
- Election Commission & Electoral Reforms

Unit- V : Issues in Indian Politics

- Debates on Secularism – Majority Communalism, Minority Communalism
- Caste in Politics and Politicization of caste
- Gender in Indian Politics
- Issues of Minorities – Sachar Committee

B.A Political Science

V th Semester

GE Paper

Politics of Development

Unit- I Development: Meaning, Nature, Importance

- Types of Development: Economic, Political and Social.

Unit- II : Development Debates

- Capitalist , Socilaist , Gandhian , Sustainable Development

Unit- III State and Development in India

- Planning, Mixed Economy, Socialistic Pattern of Society
- Sectors of Development: Industry, Agriculture, Irrigation, Land Reforms.

Unit- IV : Issues of Development in the Post-Economic Reforms period

- Economic Reforms: Liberalisation , Privatisation, Globalisation
- Development and Displacement
- Development and Environment

B.A Political Science

Vth Semester

Paper- V (A)

International Relations

Unit- I International Relations – Nature , Evolution and Scope; State and Non- State Actors in IR , Westphalian State and Sovereign State system and its characteristics

Unit-II European conquest of Asia and Africa – Its Impact on society, culture, economy (European colonialism)First World War and Second World War

Decolonization and its consequences ; Rise of the Developing world ;Neo- colonialism

Unit- III Cold War ;Détente ; End of the Cold War ;Disintegration of the Soviet Union ; American Hegemony

Unit-IV India's Foreign Policy: Determinants; features; Non- Alignment

Unit-V India's Relations with USA; China; Pakistan; Sri Lanka and Nepal

B.A Political Science

Vth Semester

Paper – V (B)

Government & Politics in Telangana

Unit- I State Politics

Historical Background of Telangana

Nizam Rule,Public Awakening in Telangana- Andhara Maha Sabha ,Library movement, Tribal Self – Assertion , Aadi Hindu Movement,

Telangana Armed Struggle, Hyderabad State's integration with the Indian Union

Unit-II States Reorganization in India

- Fazal Ali Commission , Gentleman Agreement, Hyderabad's Merger with Andhra and Formation of AP
- Mulki Rules , Regional Committees' Formation

Unit- III Demand for separate Telangana State

- 1969 Agitation.
- Telangana Praja Samithi
- Six point formula
- Telangana Movement from 1990
- Issues : Water , Financial Resources , Employment, Education and Discrimination

Unit-IV Politics of Formation of Telangana

- Justice Sri Krishna Committee Report on the condition of Telangana
- Political Parties views on Separate Telangana: INC , BJP, CPI, CPM, TRS , TDP, MIM and Role of Political JAC
- Role of Civil Society organizations : Students, Employees, Lawyers and Communities' groups

Unit-V Formation of Telangana

- Constitutional Process
- Electoral Politics in Telangana

B.A Political Science

VI th Semester

Optional Paper / Project

Contemporary Political Theory

Unit- I : Liberal Theory :

Isaiah Berlin: Two concepts of Liberty

Hannah Arendt : On Totalitarianism

Unit- II : Neo Marxist theory

Antonio Gramsci: Hegemony and Passive Revolution

Sameer Amin: Critique of Globalization

Unit- III: Feminist Theory: I

Simone de Beauvoir: Issue of Equality

Betty Friedan : Feminine mystique

Unit-IV : Feminist Theory: II

Vandana Shiva : Eco-feminism

Cynthia Enloe: Women's Experience as politics

B.A Political Science

VI th Semester

Paper – VI (A)

Global Politics

Unit- I	Power , Elements of Power , Balance of Power ,Growing importance of Soft Power
Unit-II	Security, Collective Security, Bipolarity , Multipolarity, Unipolarity
Unit- III	Human Rights; Agencies of human Rights Protection; Terrorism , Environmental Issues
Unit-IV	World Bank and IMF; UNCTAD; North – South Dialogue and South – South Co- operations; WTO
Unit-V	Disarmament, Arms Race , Arms control , NPT, CTBT, MTCR Proliferation of Small Arms, WMDs

B.A Political Science

VI th Semester

Paper- VI (B)

Social Movements

Unit- I	Introduction to Social Movements: Meaning, Nature, Significance.
	Rise of Social Movements
	Issues in Social Movements: Depravation, Identity, Justice, Assertion
Unit-II	Social Reform Movements
	Anti- Brahmin Movement: Ramaswamy Naicker, Naryana Guru
	Backward Class movements in Andhra Pradesh , Telangana and Tamil Nadu
	Women's Movement
Unit- III	Agrarian Movements
	Bharat Kisan Union
	Shetkari Sanghatana
	Karnataka Rajya Ryta Sangha
Unit-IV	Environmental Movements
	Chipko Movement
	Narmada Bacho Andholan
Unit-V	Assertion Movements
	Adivasi Movement: Jharkhand
	Dalit Movements in Maharastra, Telangana and Andhra Pradesh
	Naxalite Movement: Andhra Pradesh, Telangana and Chhattisgarh

Restructuring of Syllabus according to Choice Based Credit System (CBCS) & Scheme of Instruction and Examination for B.A. HISTORY (Regular) w.e.f. 2016-2017

BOARD OF STUDIES
DEPARTMENT OF HISTORY
SATAVAHANA UNIVERSITY
KARIMNAGAR, TELANGANA.

TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - I
History of India (From Earliest Times to c.700 CE)
Discipline Specific Course - Paper - I

Module-I: Definitions - Nature and Scope of History - History and Its Relationship with other Social Sciences - Geographical Features of India – Sources of Indian History: Pre-History – Paleolithic, Mesolithic, Neolithic, Chalcolithic and Megalithic Cultures.

Module-II: Indus Valley Civilization - Its Features & Decline; Early Vedic and Later Vedic Civilizations – Vedic Literature – Society – Economy - Polity – Religion.

Module-III: Rise of New Religious Movements – Charvakas, Lokayathas, Jainism and Buddhism; Mahajanapadas - Rise of Magadha: Alexander's Invasion and Its Impact.

Module-IV: Foundation of the Mauryan Dynasty; Ashoka and His Dharma – Polity – Administration - Society – Economy – Religion – Literature - Art and Architecture; Disintegration of the Mauryan Empire; Post-Mauryan Kingdoms - Indo-Greeks - Kushanas and Kanishka - Society – Economy – Literature – Art and Architecture; The Satavahanas; Sangam Age – Literary Development.

Module-V: Gupta Empire: A Brief Political Survey - Polity and Administration, Social and Economic Conditions, Agriculture and Land Grants - Feudalism, Caste System, Position of Women, Education, Literature, Science and Technology, Art and Architecture - Harshavardana and His Achievements.

Recommended Books:

A.L. Basham, *The Wonder that was India*, Rupa & Co., New Delhi, 2001.

Allchin, Bridget & Raymond, *The Rise of Civilization in India and Pakistan*, CUP, New Delhi, 1996.

E.H. Carr, *What is History?* Penguin Books, England, 1990.

Majumdar, R.C., *History and Culture of the Indian People*, Vols. I, II & & III.

Romila Thapar, *Asoka and the Decline of the Mauryas*, OUP, New Delhi, 1995.

Romila Thapar, *Early India (From the earliest to AD 1300)*.

Romila Thapar, *A History of India*, Vol. I, Penguin Books, New Delhi, 1990.

Upinder Singh, *A History of Ancient and Medieval India*.

TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - II
History of India (c.700-1526 CE)
Discipline Specific Course - Paper - II

Module-I: Rise of Regional States: Pallavas, Chalukyas of Badami, Rashtrakutas, Cholas; Local Self Government under Cholas; Society, Economy, Literature, Art and Architecture; Bhakti Movement in South India: Shaiva Nayanars and Vaishnava Alwars.

Module-II: Arab Conquest of Sind, Ghaznavids and Ghoris; Foundation of Delhi Sultanate: Slave, Khaljis, Tughlaqs, Sayyids and Lodis – Polity, Administration, Society and Economy - Art and Architecture - Growth of Education and Literature - Religious Conditions.

Module-III: Bhakti and Sufi Movements and their Impact on Society and Culture - Emergence of Composite Culture.

Module-IV: Kakatiyas – Polity – Administration - Society and Economy - Literature and Religion – Art and Architecture – Yadavas – Hoysalas and Pandyas – Brief History.

Module-V: Vijayanagara – Polity – Administration - Society and Economy – Religion – Art and Architecture – Language and Literature – Bahamanis and their Contribution to the Deccan Culture.

Recommended Books:

A.L. Basham, *The Wonder that was India*, Rupa & Co., New Delhi, 2001.
Irfan Habib, *Medieval India-I*, OUP, Delhi, 1999.
K.A. Nilakanta Sastri, *A History of South India*.
Majumdar, R.C., *History and Culture of the Indian People*, Vols. I, II & & III
Romila Thapar, *Early India (From the earliest to AD 1300)*.
Satish Chandra, *Medieval India (From Sultanate to the Mughals)*, Part-I, Har-Anand Publications, New Delhi, 1997.
Upinder Singh, *A History of Ancient and Medieval India*.
Vipul Singh, *Interpreting Early and Medieval India*.

Telugu:

A. Bobbili and others, *Bharatha Desha Charitra upto A.D. 1526* Telugu Academy, Hyderabad, 2003.
D.D. Kosambi, *Bharatha Desha Charitra Parichaya Vyasalu*, Hyderabad Book Trust, Hyderabad, 1996.

D. Satyanarayana, *Kotha Paryataka Sthalalu* (Telugu).

TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - III
History of India (1526-1857 CE)
Discipline Specific Course - Paper - III

Module-I: Establishment of Mughal Dynasty - Sources – Shershah Sur and His Reforms - Brief Survey of Political History of Mughals – Akbar, Shah Jahan and Aurangzeb - Polity - Administration – Society – Economy – Technological Developments - Religion – Hindu-Muslim Relations – Emergence of Composite Culture – Education – Language and Literature – Art and Architecture - Disintegration of Mughal Empire.

Module-II: Rise of Regional Powers - Marathas – Shivaji and His Administration – Peshwas - Sikhs.

Module-III: Advent of European Powers - Portuguese, Dutch, English and French, Anglo-French Rivalry - Expansion and Consolidation of British Power – Wellesley's Subsidiary Alliance – Dalhousie's Doctrine of Lapse.

Module-IV: Three Stages of Colonialism – Mercantilism - Free Trade Policies – Finance Capital – Land Revenue Settlements – Cornwallis and Permanent Revenue Settlement; Thomas Munroe and Ryotwari; Mahalwari System – Changes in the Agrarian Economy and Condition of Peasantry – Famines.

Module-V: Decline of Rural Cottage Industries and Urban Handicrafts - Growth of Railways, Roads, Communication – Modern Industries – Coal Mines, Textiles, Iron and Steel, etc. - Anti-Colonial Upsurge - 1857 Revolt – Nature, Causes and Results.

Recommended Books:

A.L. Srivastava, *History of India from A.D. 1000 to 1707*.
A.R. Desai, *Social Background of Indian Nationalism*.
Bipan Chandra, *A History of Modern India*.
Harbans Mukhia, *The Mughals*.
John F. Richards, *The Mughal Empire*, CUP, New Delhi, 1995.
R.C. Majumdar (ed.), *A History and Culture of India People*, Bharatiya Vidya Bhavan Series (Relevant Vols.).
R.C. Majumdar, H.C. Raychaudhuri & K. Datta, *An Advanced History of India*, Macmillan, Madras, 1995.
Satish Chandra, *Medieval India*, Vol. II.
Sumit Sarkar, *Modern India (1885-1947)*, Macmillan India Ltd., Madras, 1995.
Tarachand, *A History of the Freedom Movement in India*, Four Volumes.
V.D. Mahajan, *History of Medieval India (Sultanate Period and Mughal Period)*.
V.D. Mahajan, *Modern Indian History*.

Telugu:

B. Laxminarayana Rao, *Bharatadesa Swathantra Charitra* (Part-3), (Trans.), Telugu Academy, 2005.
Bipan Chandra, *Adhunika Bharatadesa Charitra* (Translation Sahavasi), Hyderabad Book Trust.
J. Durga Prasad and Others, *Bharatadesa Charitra (1526-1964 A.D.)*, Telugu Academy, 2006.
V. Rama Krishna Reddy, *Bharatadesa Charitralo Mukhya Ghattalu*, Telugu Academy, 2005.

TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - IV
History of India (1858-1964 CE)
Discipline Specific Course - Paper - IV

Module-I: Queen's Proclamation – Beginning of Colonial Rule – Introduction of Western Education – Role of Christian Missionaries – Press, Communication and Emergence of Middle Classes - Lytton and Rippon: Impact of their Policies.

Module-II: Socio-Religious Reform Movements – Brahma Samaj - Arya Samaj - Theosophical Society - Ramakrishna Mission - Aligarh Movement; Anti-Caste Movements - Jyotibha Phule - Narayana Guru - Periyar Ramaswamy Naicker and Dr. B.R. Ambedkar.

Module-III: Factors for the Rise of Nationalism – Formation of Indian National Congress – Three Phases of Freedom Struggle: Moderate Phase, Extremist Phase and Gandhian Era - Non-Cooperation, Civil Disobedience and Quit Indian Movement; Indian National Army and Subhash Chandra Bose.

Module-IV: Revolutionary Movement: Gadhar Party – Bhagath Singh – Chandra Sekhar Azad and Others; Left-Wing Movement – Rise of Socialist and Communist Parties - Peasant and Workers Movements.

Module-V: Emergence of Communal Politics and Mohd. Ali Jinnah – Prelude to Partition of India - Sardar Vallabhai Patel and Integration of Princely States into Indian Union – Republic of India – Jawaharlal Nehru and His Policies.

Recommended Books:

A.R. Desai, *Social Background of Indian Nationalism*, Popular Prakashan Pvt. Ltd., Mumbai, 2002.

Bipan Chandra (et.al.), *India's Struggle for Independence*, Penguin Books, Kolkata, 2001.

Bipan Chandra, *A History of Modern India*.

Kenneth Jones, *Social and Religious Reform Movements in India*.

R.C. Majumdar (ed.), *A History and Culture of India People*, Bharatiya Vidya Bhavan Series (Relevant Vols.).

R.C. Majumdar, H.C. Raychaudhuri & K. Datta, *An Advanced History of India*, Macmillan, Madras, 1995.

S. Gopal, *Jawaharlal Nehru – A Biography*.

Sumit Sarkar, *Modern India (1885-1947)*, Macmillan India Ltd., Madras, 1995.

Tarachand, *A History of the Freedom Movement in India*, Four Volumes.

V.D. Mahajan, *Modern Indian History*.

Telugu:

B. Vijaya Bharati, *Mahatma Jyothirao Phule* (Translation), Hyderabad Book Trust, 2004.

Bhoopati Laxminarayana Rao, *Bharatadesa Swathantra Charitra* (Part – 3), (Translation), Telugu Academy, 2005.

Bipan Chandra, *Adhunika Bharatadesa Charitra* (Translation Sahavasi), Hyderabad Book Trust.

J. Durga Prasad and Others, *Bharatadesa Charitra (upto 1526-1964 A.D.)*, Telugu Academy, 2006.

V. Rama Krishna Reddy, *Bharatadesa Charitralo Mukhya Ghattalu*, Telugu Academy, 2005.

TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - V
Indian National Movement (1857-1947 CE)
Generic Elective - Paper - I

Module-I: 1857 Revolt – Causes - Consequences - Factors for the Rise of Nationalism – English Education – Communications, News Papers – Economic Exploitation – Socio-Religious Reform Movements – Political and Administrative Unity - Emergence of Educated Intelligentsia.

Module-II: Formation of Indian National Congress – Its Aims & Objectives - Three Phases of India's Freedom Struggle – Moderates and Extremists – Their Ideology: Constitutional Type of Agitation – Vandemataram and Home Rule Agitations.

Module-III: Emergence of Gandhi – His Ideology, Non-Cooperation and Civil Disobedience Movements - Role played by Women - The Militant Nationalists – Their Ideology – Bhagath Singh – Rise of Left Ideology.

Module-IV: Origin of Peasant and Tribal Movements – Growth of Working Class Movement - Azad Hind Fauz – Subash Chandra Bose - Origins of Communalism – Factors for the Rise of Communalism – All India Muslim League and Hindu Mahasabha – Their Activities.

Module-V: Second World War – Quit India Movement - Cripps Proposals; Cabinet Mission, Partition and Indian Independence.

Recommended Books:

A.R. Desai, *Social Background of Indian Nationalism*, Popular Prakashan Pvt. Ltd., Mumbai, 2002.
Bipan Chandra, *Nationalism and Colonialism in Modern India*, Orient Longman, New Delhi, 1979.
Bipan Chandra, *India's Struggle for Independence*, Penguin Books, Kolkata, 2001.
Sumit Sarkar, *Modern India (1885-1947)*, Macmillan India Ltd., Madras, 1995.
Sekhar Bandyopadhyay, *National Movement in India*, Oxford University Press, New York, 2009.
Sekhar Bandyopadhyay, *From Plassey to Partition*, Orient Longman Pvt. Ltd., New Delhi, 2004.
Amles Tripathi, Barun De and Bipin Chandra, *Freedom Struggle*, National Book Trust, 2007.
D. Rothermund, *The Phases of Indian Nationalism and Other Essays*, Nachiketa Publications, Bombay, 1970.
R. Suntherlingam, *Indian Nationalism – An Historical Analysis*, Vikas Publishing House, New Delhi, 1983.
D.N. Dhanagare, *Peasant Movements in India, 1920-1950*, Oxford University Press, New Delhi, 1991.
Ahmed, *Jinnah, Pakistan and Islamic Identity – The Search for Saladin*, Routledge, London, New York, 1997.
Mushirul Hasan (Ed.), *India's Partition - Process, Strategy and Mobilization*, Oxford University Press, Delhi, 1993.
Kapil Kumar (Ed.), *Congress and Classes: Nationalism Workers and Peasants*, Manohar Publishers, New Delhi, 1988.
D. Argov, *Moderates and Extremists in Indian Nationalist Movement, 1883-1920*, Asia Publishing House, London, 1967.

TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - V
World History (1453-1815 CE)
Discipline Specific Course – Paper - V

Module-I: Fall of Constantinople (1453 C.E.) – Beginning of Modern Age in Europe – Geographical Discoveries and Scientific Inventions and their impact on Society – Rise of New Ideas – Spirit of Humanism – Renaissance – Meaning-Causes and Results – Impact of Renaissance on Europe.

Module-II: Reformation Movement – Causes – Martin Luther, John Calvin and Zwingli; Counter Reformation Movement and Ignatius Loyola – Results of Reformation and Counter Reformation.

Module-III: Emergence of Nation States – Causes – Spain – Charles V; England – Henry VIII - Glorious Revolution (1688); France under Bourbons – Louis XIV; Era of Enlightened Despotism – Peter the Great and his Policies – Frederick the Great and his Achievements.

Module-IV: End of Feudalism – Industrial Revolution – Causes for Industrialization in England and Europe – Textile Industry – Working Class Movement – American War of Independence (1776) – French Revolution (1789) – Causes, Course, Results and its Impact. Factors for the Rise of Napoleon – Domestic and Foreign Policies – Fall of Napoleon.

Recommended Books:

V.H.H. Green., *Renaissance and Reformation.*
C.J.H. Hayes., *Modern Europe to 1870.*
H.A.L. Fisher., *A History of Europe*, Vol. I, II and III.
B.V. Rao., *World History.*
K.L. Khurana., *Modern Europe.*
L. Mukherjee., *A Study of Europe History 1453-1815.*
Arjun Dev, *History of the World: From the Late Nineteenth to the Early Twenty-First Century.*
Timothy, C.W. Blanning, *The Pursuit of Glory: Europe 1648-1815.*
Eric Hobsbawm, *The Age of Revolutions: 1789-1848.*

Telugu:

Adhunika Prapancha Charitra, Telugu Academy.
Adhunika Europa Charitra, Telugu Academy.
History of Modern World, Telugu Academy.
Adhunika Yugaarambham, Telugu Academy.

TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - V
History of Telangana (From Earliest Times to 1724 CE)
Discipline Specific Elective - Paper - I (A)

Module-I: Sources – Archaeological and Literary Sources - Geographical Features of Telangana - Pre History – The Age of Satavahanas – Origin – Administration - Society and Economy – Religion - Language & Literature - Art & Architecture

Module-II: Post-Satavahana Period - Ikshvakus – Vishnukundins – A Brief Political History – Society – Economy – Religion - Language & Literature - Art & Architecture – Origin and Early History of Chalukyas of Badami and their Contribution to Culture - Chalukyas of Vemulavada & Mudigonda - Political History – Society – Economy – Religion - Language & Literature - Art & Architecture.

Module-III: Kakatiyas – Origin and Early History – Ganapatideva, Rudramadevi and Prataparudra - Administration - Society – Economy – Language & Literature - Art & Architecture – Sammakka-Sarakka Revolt - Post-Kakatiya Political Developments – Musunuri Nayakas, Recherla Rulers – Their Contribution to Culture.

Module-IV: Qutb Shahis of Golconda – Origin and Political History – Society – Economy - Agriculture – Irrigation – Trade & Commerce – Religion – Language & Literature - Art & Architecture – Political Conditions in Telangana from 1687 to 1724 – Life and Times of Sarvai Papanna.

Recommended Books:

G. Yazdani, *Early History of Deccan*, 2 Vols.
D. Raja Reddy, *The Study of Satavahana History: The Source Material*.
K. Satyanarayana, *A Study of History and Culture of Andhras*, Vol. I & II.
----------, *History of Minor Chalukyan Families in Andhra Desa*.
Balendru Sekharam, *Andhras through the Ages*.
M. Rama Rao, *Andhra through the Ages*.
K. Gopalachary, *Early History of Andhra Country*.
Parabrahma Sastry, *The Kakatiyas*.
H.K. Sherwani, *History of Qutb Shahis*.
Comprehensive History of Andhra Pradesh, Vol. I to V.
Richard, M. Eaton, *Social History of Deccan*.

Telugu:
Suravaram Pratapa Reddy, *Andhrula Sanghika Charitra*.
P. Sree Rama Sarma, *Andhrula Charitra upto 1330 A.D.*
B.S.L. Hanumantha Rao, *Andhrula Charitra*.
B.N. Sastry, *Recharla Padmanayakulu*.
Comprehensive History of Andhra Pradesh, Vol. I to V.

TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - VI
History of Telangana Movement and State Formation (1948-2014 CE)
Generic Elective - Paper - II

Module I: Historical Background: Telangana its Geographical features, Social, Political, Economical and Cultural Conditions – Origin of Mulki-Non-Mulki issue - Farman of 1919 – Merger of Hyderabad State into Indian Union in 1948; Employment Policies under Military Rule and Vellodi, 1948-52; Violation of Mulki-Rules and its Implications.

Module-II: Hyderabad State – Formation of Popular Ministry under Burgula Ramakrishna Rao and 1952 Mulki-Agitation; City College Incident – Its importance, Jagan Mohan Reddy Committee Report, 1953 – Demand for Telangana State – States Reorganization Commission (SRC) and its Recommendations – Dr. Ambedkar's views on smaller states – Formation of Andhra Pradesh, 1956, Gentlemen's Agreement and its Provisions Telangana Regional Committee, Composition, Functions and Performance – Violation of Safeguards – Post – 1970 Socio-Economic Scenario in Telangana – Origins of Telangana Agitation – 1969 Agitation for Separate Telangana, Role of Intellectuals, Students and Employees.

Module III: Formation of Telangana Praja Samithi and Spread of Telangana Movement – All Party Accord – G.O.36 – Suppression of 1969 Telangana Movement and its Consequences – The Eight Point and Five-Point Formulas – Implications – Six Point Formula 1973, and its Provisions; Article 371-D, Presidential Order, 1975 Officers Committee Report – GO-610 (1985), its Provisions and Violations Anti-Landlord Struggles in North Telangana – Alienation of Tribal Lands and Adivasi Resistance – Komaram Bheem.

Module-IV: Rise of Regional Parties in 1980's and Changes in the Political, Socio-Economic and Cultural fabric of Telangana, Liberalization and Privatization Policies and their consequences – Regional disparities and imbalances – Public awakening and Intellectual reaction against discrimination – formation of Civil Society Organizations Articulation of separate Telangana Identity, Telangana Information Trust – Telangana Aikya Vedika, Telangana Maha Sabha – Warangal Declaration – Role of Osmania and Kakatiya University Students and Others.

Module-V: Formation of Telangana Rashtra Samithi in 2001 TRS in UPA – Girglani Committee – Telangana Employees Joint Action Committee – Telangana in Election Manifestos – Political Parties - Dalit-Bahujan Sanghams and Grass root organizations for the cause of Telangana – Role of Telangana Political Joint Action Committee – Cultural expressions in Telangana Movement – Role of various social groups in the transformation of the agitation into a mass movement – Forms of Protest Sakala Janula Samme, Non-Cooperation Movement; Million March, etc – All Party Meeting – Sri Krishna Committee and its Recommendations, Parliamentary proceedings, Declaration of Telangana State, Andhra Pradesh State Reorganization Act, 2014 – Formation of Telangana State.

Recommended Books:

Karen Leonard, *Hyderabad and Hyderabadis*

V.K. Bawa, *The Last Nizam*

Lucien Benichou, *From Autocracy to Integration: Hyderabad, 1038-48*

K.V. Narayan Rao, *Emergence of Andhra Pradesh*

A.V. Ramana Rao, *Economic Development of Andhra Pradesh*, 2 Volumes

Ananda Rao, Thota, *Proceedings of the Telangana University Colleges Teachers Convention*

Ch. Hanumantha Rao, *Regional Imbalances – Telangana*

Gautham Pingle, *Fall and Rise of Telangana*

K. Jayashankar, *Telangana Rashtram – Oka Demand* (**Telugu**)

V. Prakash, *Telangana: Vivamalacharitra Rashtra Avirbhavam*, (**Telugu**)

TELANGANA STATE
B.A. (HISTORY) SYLLABUS
Semester - VI
World History (1815-1950 CE)
Discipline Specific Course - Paper - VI

Module-I: Congress of Vienna (1815) – Principles and Impact; Metternich and his System – 1830 and 1848 French Revolutions: Unification of Italy – Role of Joseph Mazzini, Count Cavour and Garibaldi; Unification of Germany – Role of Bismarck; Significance of the Unification Movements.

Module-II: Factors responsible for the outbreak of First World War (1914-18) – Results – Treaty of Versailles – Its Provisions and Consequences; Russian Revolution (1917) – Causes – The role of Lenin – Results; League of Nations (1920) – Its Achievements and Failures.

Module-III: Europe between World Wars: Turkey under Mustafa Kamal Pasha - The Great Economic Depression and its Impact - Mussolini and the Rise of Fascism in Italy - Hitler and Nazism in Germany - Militarism in Japan.

Module-IV: Second World War – Causes and Results; Establishment of United Nations Organization (1945) – Its Aims and Achievements; Cold War and Its Impact; Colonization of Asia - India and China under Colonial Rule. Role of Gandhi in Indian National Movement (1920-1947); Sun-Yat-Sen and His Ideas; Role of Mao-Tse-Tung in Chinese Revolution – 1949.

Recommended Books:

David Thompson., *Europe since Napoleon.*
C.D.M. Kettleby., *History of Modern Times.*
H.A.L. Fisher., *A History of Europe*, Vol. I, II, and III.
C.J.H. Hayes., *Contemporary Europe since 1870.*
L. Mukherjee., *A Study of Europe History 1453-1815.*
B.V. Rao., *World History.*
K.L. Khurana., *Modern Europe.*
Tony Judt, *Postwar: A History of Europe since 1945.*
Eric Hobsbawm, *The Age of Revolutions: 1789-1848.*
Arjun Dev, *History of the World: From the Late Nineteenth to the Early Twenty-First Century.*

Telugu:

Adhunika Prapancha Charitra, Telugu Academy.
Adhunika Eiropa Charitra, Telugu Academy.

B.A. (ECONOMICS) SYLLABUS
Semester -
MICRO ECONOMICS - I
Discipline Specific Course - Paper - I

Module-I: CONSUMER BEHAVIOUR:

Ordinal utility Analysis: Properties of Indifference curves, concept of budget line, equilibrium of consumer, price consumption curve, income consumption curve, derivation of demand curve with the help of ordinal utility analysis. Concepts of price, income and substitution effects; separation of price effect: compensating variation and cost difference methods.

Module-II PRODUCTION ANALYSIS

Concepts of Short run and long run production function; properties of iso-product curves, concept of factor price line, analysis of least cost input combination, concepts of expansion path and economic region of production, concept of returns scale and types of returns to scale. Linear and homogeneous production function, properties of Cobb-Douglas production function.

Module-III: COST AND REVENUE ANALYSIS

Cost concepts: Accounting, real, opportunity, explicit cost. Total cost, total fixed cost, total variable cost, average cost, average fixed cost, average variable cost, marginal cost and the relationship between average and marginal cost, derivation of long run average cost curve. Economies of scale: internal and external.

Revenue concepts: total, average and marginal, relationship between Average revenue & marginal revenueand price elasticity of demand.

Module--IV: MARKET STRUCTURE: IMPERFECT COMPETITION

Monopoly: Equilibrium of a monopolist with price discrimination, degrees of price discrimination, welfare loss under monopoly. Monopolistic competition: characteristics, concepts of product differentiation and selling cost, analysis of resource wastage under monopolistic competition. Oligopoly: characteristics of oligopoly, reasons for price rigidity in non-collusive oligopoly. Duopoly: Augustin Cournot's modern version of duopoly.

Module-V: ANALYSIS OF BUSINESS FIRM, PROFIT AND PRICING STRATEGIES

Characteristics of a business firm, objectives of business firm: profit maximization, sales revenue maximization, market share maximization, growth maximization. Profit concepts: Accounting and economic; break-even point and profit –volume analysis

Pricing strategies: Cost plus pricing, marginal cost pricing, rate of return pricing, price skimming, penetration pricing, loss-leader pricing, mark-up pricing and administered prices.

B.A. (ECONOMICS) SYLLABUS
Semester - II
MACRO ECONOMICS
Discipline Specific Elective - Paper - II

Module– I: Introduction

Macro Economics – Concept of Circular Flow of Incomes –National Income Analysis: Concepts and Components – Methods of Measurement –Difficulties and Limitations in the Estimation of National Income.

Module – II: Theories of Income and Employment

Keynesian Theory of Income and Employment: Effective Demand – Consumption Function: Average Propensity to Consume (APC) and Marginal Propensity to Consume (MPC) – Factors Determining Consumption Function – Savings Function: Average Propensity to Save and Marginal Propensity to Save – Concepts of Multiplier and Accelerator

Module– III: Investment & Theories of Interest Rate

Capital and Investment: Types of Investment, Determinants of Level of Investment – Marginal Efficiency of Capital and Marginal Efficiency of Investment, Neo-Classical and Keynesian Theories of Interest .

Module – IV: Supply of Money & Demand for Money.

Functions and Classification of Money – Money Supply – Measures of Money Supply with reference to India: M1, M2, M3 and M4 – Classical Theories of Money: Fisher's and Cambridge Versions of Quantity Theory of Money – Keynes' Theory of Money and Prices.

Module– V: Inflation & Trade Cycles

Inflation: Concept, Types, Causes and Measurement – Effects of Inflation – Measures to Control Inflation – Concepts of Phillips Curve, Deflation and Stagflation – Trade Cycles: Concept, Causes and Phases of trade cycle.

Reference Books:

Ackley, G (1976) : Macro Economics: Theory and Policy, Macmillan, New York

B.A. (ECONOMICS) SYLLABUS
Semester - III
DSE-SEMESTER – III: STATISTICS FOR ECONOMICS

Module – I: Introduction to Statistics

Meaning and Basic Concepts of Statistics – Population and Sample, Frequency Distribution, Cumulative Frequency – Graphic and Diagrammatic Representation of Data – Types of Data: Primary and Secondary Data – Methods of Collecting Data: Census and Sampling Methods (Random, Non-random Sampling Methods)

Module – II: Measures of Central Tendency and Dispersion

Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean – Properties of Good Average – Comparison of Different Averages – Measures of Dispersion – Absolute and Relative Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Coefficient of Variation and Variance

Module – III: Correlation and Regression

Correlation: Meaning and Types – Karl Pearson's Correlation Co-efficient – Spearmen's Rank Correlation – Regression: Meaning and Uses of Regression.

Module – IV: Index Numbers

Meaning and Uses – Aspects and Difficulties in the Construction of Index Numbers - Types of Index Numbers – Methods of Index Numbers - Laspayer, Paasche and Fisher.

Module – V: Analysis of Time Series

Meaning and Uses – Components of Time Series Analysis: Secular, Seasonal, Cyclical and Irregular Variations – Methods of Measurement of Secular Trends: Graphic, Semi-Averages, Moving Averages .

Reference Books:

Allen, RGD : Mathematical Analysis for Economists, Macmillan Press, London.
Bhardwaj RS : Mathematics for Economics and Business, Excel Books, New Delhi
Bose : Mathematics for Economics, Himalaya Publishing, New Delhi
Chiang, AC : Fundamental Methods of Mathematical Economics McGraw Hill, New Delhi
Nagar & Das : Basic Statistics
S.P. Gupta : Statistics
G.S. Mongha : Mathematics for Economists

B.A. (ECONOMICS) SYLLABUS
Semester - III
RURAL DEVELOPMENT
Skill Enhancement Course-I - Paper – II

Module-I Aspects of Rural Development

Concept of Rural Development, Rural Development vs. Agricultural Development, Role of NGOs in Rural Development, Rural Non farm sector and Rural Development, Decentralized planning and Participatory development, role Panchayats in decentralized in rural development.

Module-II Rural Credit and Self Help Groups

Role of National Bank for Agriculture and Rural Development (NABARD) for rural development, Constraints of micro-enterprises in rural areas, credit need for rural non farm sector, the concept of micro credit, Micro credit role of Grameen Bank, SHG's in India Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and rural development.

References

1. Katar Singh , Rural Development : Principles, Policies and Management, Sage Publications,New Delhi
2. K.G. Karmakar, Rural Credit and Self-Help Groups, Sage Publications, New Delhi
3. S.Sau, Rural Industrialization –Development Trajectory in India, Farma K.L.M., Kolkata
4. Misra D. and Puri K. Indian Economy, Himalaya Publishing House
5. Datt and Sundharam (Revised by G.Datt and A. Mahajan) , Indian Economy, 70th edition, S.Chand
6. N. Narayanasami, Participatory Rural Appraisal: Principle, Methods and Applications, SagePublications, New Delhi, 2009.
7. Vasant Desai, A Study of Rural Economics, Himalaya Publishing House, New Delhi.
8. Mahi Pal, —Panchayati Raj and Rural governancel, Economic and Political Weekly, Jan. 10-16, vol. XXXIX, 2004,No.2, p.13 16.
9. Raghava, D. V. Rao, Panchayats and Rural Development, Ashish Publishing House, New Delhi,1980.
10. Ram Reddy, Pattern of Panchayati Raj in India, Heritage Publishers, New Delhi, 2

B.A. (ECONOMICS) SYLLABUS
Semester - IV
INDIAN ECONOMY
Discipline Specific Course - Paper – IV

Module I: Structure of the Indian economy:

Indian Economy at the time of Independence. Changes in the Composition of National Income and Employment. Natural Resource base: Land, Water, Forest, Mineral and Metal Resources. Population: Size, Growth and Composition and their implications for Indian economy.

Module II: Indian Agricultural Sector:

Importance and Role of Agriculture. Trends in Agricultural Production and Productivity. Land Reforms. Green Revolution. Agricultural Finance. Agricultural Marketing. Agricultural Price Policy. Food Security in India.

Module III: Indian Industrial Sector:

Role and Importance of Industrialization. Trends in Industrial Production. IndustrialPolicy Resolutions: 1956, 1991 The Role of Public and Private Sectors. Formal and Informal Sectors in Industry.

Module V: Indian Service Sector:

Service sector: Concept, Components and its role –Infrastructural Development: Education, Health, Transport, Banking, Insurance and Information Technology.

Economic Reforms: Liberalization, Privatization and Globalization – A Critical Evaluation.

Module IV: NIIT AAYOG

Demise of planning commission. Genesis of NITI Aayog: structure and composition of NIIT Aayog, Functions and objectives of NIIT Aayog, Differences between NIIT Aayog and planning commission, Economic prism- cooperative federalism platform for interface between Centre and State. NIIT Aayog role in strategic planning and innovation and knowledge hub. Challenges ahead.

References:

1. SK Misra and Puri : Indian Economy, Himalaya Publishing House.
2. Ishwar C Dhigra : The Indian Economy: Environment and Policy, SC Chand & Sons, New Delhi RC Dutt and
3. KPM Sundaram : Indian Economy
4. PK Dhar : Growing Dimensions of Indian Economy,

B.A. (ECONOMICS) SYLLABUS
Semester - IV
SEC-4 ENTREPRENEURSHIP AND DEVELOPMENT

Module-I Basic Issues of Entrepreneurship and Economic Development

Basic features of Entrepreneurship, Entrepreneurship and its linkages with economic development, Growth of entrepreneurship in India- Role of entrepreneurship in Economic Development and problems of rural entrepreneurship in India.

Module-II Financial Resources for new ventures of an entrepreneur:

Source of finance, capital structure, Institutional support to enterprises- National Small Industries Board- State Small Industries Development Corporation- District Industrial estates- Indian Experience, Stages of growth, types of growth strategies of expansion, Diversification, joint venture, merger and subcontracting.

References:

1. S.S. Khanka Entrepreneurial Development, S Chand & Company Ltd.
2. David . H. Holt- Entrepreneurship New Venture Criterion
3. Poornima M. Entrepreneurship Development and Small Business Enterprises (2nd Edition Pearson)
4. Datt and Sundaram (Revised by A. Mahjan), Indian Economy, 70th Edition, S Chand.

B.A. (ECONOMICS) SYLLABUS
Semester - V
PUBLIC ECONOMICS
Discipline Specific Elective- Paper – V-B

Module - I: Introduction

Meaning and importance of Public finance - Evolution of public finance. Multiple theories of public household-Public and Private goods-Markets mechanism in public and private goods. State as an agent of planning and development

Module- II: Public Expenditure

Theories of public expenditure- Wagner' s law of increasing state activities – Peacock Wisemans hypothesis- Principle of Maximum Social advantage –Growth and pattern of public expenditure, Effects of public expenditure-Cost benefit analysis.

Module- III: Taxation & Public Debt

Approaches to taxation- Benefit approach, Ability to pay approach and Neutrality approach- Elasticity and buoyancy of taxation-incidence and shifting of taxation-Types and classification of taxes and VAT, Approaches to public debt.

Module- IV: Fiscal Policy & Federal Finance

Definition of fiscal policy and its objectives; Fiscal Policies for redistribution of income and wealth and stabilization – fiscal policies in a developing country, federal financial structure andits main features – Direct taxes-Income tax-Corporate tax. Indirect tax structure- –GST

Module- V: Budget

Budget – Classification of budgets –Economic, Functional, organizational, classification of budgets- performance programming and zero based budgets- surplus, balanced and deficit budgets- Concepts of budget deficit and their implications – State and Central budgets. Fiscal crisis and Fiscal sector reforms in India;.

References

1. Atkinson, A Band J.E Siglitz (1980) :Lecturers on Public Economics, Tata McGraw Hill, New York.
2. Auerbach, A J and M. Feldson (Eds.) (1985) :Handbook of Public Economics, Vol. 1, North Holland, Amsterdam.
3. Buchanan, J M (1970) :The Public Finances, Richard D Irwin, Homewood.
4. Goode, R (1986) : Government Finance in Developing Countries, Tata McGraw Hill, New Delhi.
5. Houghton, J M (1970) : The Public Finance: Selected Readings, Penguin, Harmondsworth.
6. Jha, R (1998): Modern Public Economics, Routledge, London.
7. Menutt, P (1996) :The Economics of Public Choice, Edward Elgar, U.K.
8. Musgrave, R A and P.B. Musgrave (1976) : Public Finance in Theory and Practice, McGrawHill, Kogakusha, Tokyo.
9. S K Singh Public Economics
10. Om prakash Public Economics

B.A. (ECONOMICS) SYLLABUS

Semester - VI

DEVELOPMENT ECONOMICS

Discipline Specific Elective - Paper – VI B

Module- I: Economic Development and Growth

Concepts of Economic Growth and Development. Measurement of Economic Development: Per Capita Income, Basic Needs, Physical Quality of Life Index, Human Development Index and Gender Empowerment Measure. Role of State and Market in Economic Development

Module- II: Factors in Economic Development

Factors effecting Economic Development-Characteristics of developing Countries- Population and Economic Development- Theories of Demographic Transition. Human Resource Development and Economic Development

Module- III: Theories of Economic Development

Theories of Adam Smith, David Ricardo, Karl Marx and Schumpeter

Module- IV : Theories of Under Development

Lewis, Rodan, Fibenstien, Nurkse's Balanced Growth Strategy, Hirsch man's Un-balanced Growth Strategy, Myrdal model.

Module-V: Infrastructure and Economic Development

Infrastructure and Economic Development- Infrastructure as a Public Good- Concepts and Components of Social and Physical Infrastructure – Special Characteristics of Public Utilities- Social Infrastructure- Education and Health- Information and Communication Technology (ICT)- Role of ICT in Economic Development.

References:

Meier, Gerald. M : Leading issues in Economic Development, OUP, Delhi

Todaro, Micheal P : Economic Development in the third world, Orient Longman, Hyderabad

Dhalak, Subrata : Introduction to development economics

Sukhamoy, Chakravarthy : Development Planning- Indian Experience, OUP, Delhi

M. L. A. Puri : Economic Development and Planning, theory and practice

B.A. (ECONOMICS) SYLLABUS
Semester - VI
INDUSTRIAL ECONOMICS
Discipline Specific Elective - Paper – VI- C

Module –I: Meaning and classification of Industries.

Use-based, Resource Based and ASI Two and Three Digit classification. Industrial Location theories: Weber, Sargent Florence, and Losch - factors affecting industrial location.

Module II: Market Structure and Market Performance:

Types of Markets based on Place, Time and Competition. Concepts & Organization of a firm. Market Structure; Sellers Concentration; Product Differentiation; Entry Conditions; Economics of Scale.

Module III: Industrial Pattern under Five Year Plan;

Industrial economic concentration and remedial measures. Industrial Policy 1991: Role of Public and Private Sector, LPG Program. Recent Trends in Industrial growth.

Module –IV: Industrial Finance:

Industrial Finance: Owned, External and other Components of Funds; Role, Nature, Volume and types of Institutional Finance – State Level Financial Institutions and Commercial Banks.

Basic Reading List:

1. Ahuliwalia, I.J. (1985) Industrial Growth in India, Oxford University Press, New Delhi.
2. Barthwal, R.R. (1985), Industrial Economics, Wiley Eastern Ltd., New Delhi.
3. Chernuliam, F. (1994), Industrial Economics: Indian Perspective (3RD Edition), Himalaya Publishing House, Mumbai.
4. Desai, B. (1999), Industrial Economy in India (3rd Edition,) Himalaya Publishing House, Mumbai.
5. Divine, P.J. and R.M. Jones Et. Al (1976), An Introduction to Industrial Economics, George Allen and Unwin Ltd., London.
6. Hay, D. and D.J.Morris (1979), Industrial Economics: theory and evidence, Oxford University Press, New Delhi.
7. Kuchhal, S.C. (1980), Industrial Economy of India (5th Edition), Chaitanya Publishing House, Allahabad.
8. Sing, A and A.N.Sadhu (1988), Industrial Economics, Himalaya Publishing House, Mumbai.

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**	**DSC-3A**	**4T** } **= 7** **3P**	**4** } **=5** **1**
	Laboratory Course – I (Qualitative Analysis - Semi Micro Analysis of Mixtures)			
	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**	**DSC-3B**	**4T** } **= 7** **3P**	**4** } **=5** **1**
	Laboratory Course - II (Quantitative Analysis – Titrations)			
	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** } **= 7** **3P**	**4** } **=5** **1**
	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**	**DSC-3D**	**4T** } **= 7** **3P**	**4** } **= 5** **1**
	Laboratory Course - IV (Qualitative Analysis of Organic Compounds)			
	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.

B.Sc. I Yr CHEMISTRY
SEMESTER WISE SYLLABUS
SEMESTER I
Paper – I
Chemistry - I

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 σoverlapping. 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.

Unit- II

1. Organic Chemistry by Morrison and Boyd.
2. Organic Chemistry by Graham Solomons.
3. Organic Chemistry by Bruice Yuranis Powla.
4. Organic Chemistry by L. G. Wade Jr.
5. Organic Chemistry by M. Jones, Jr
6. Organic Chemistry by John McMurry.
7. Organic Chemistry by Soni.
8. General Organic chemistry by Sachin Kumar Ghosh.
9. Organic Chemistry by C N pillai

Unit III

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+}

$Hg^{2+}, Pb^{2+}, \ Bi^{3+}, Cd^{2+}, Cu^{2+}, \ As^{3+/5+}, Sb^{3+/5+}, Sn^{2+/4+}$

$Al^{3+}, \ Cr^{3+}, Fe^{3+}$

$Zn^{2+}, Ni^{2+}, Co^{2+}, Mn^{2+}$

$Ba^{2+}, \ Sr^{2+}, Ca^{2+}$

$Mg^{2+}, \ NH_4^+$

B.Sc I Yr CHEMISTRY
SEMESTER WISE SYLLABUS
SEMESTER II
Paper – II
Chemistry – II

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_2SO_4. Physical properties – Absence of Hydrogen bonding, insoluble in water, low boiling point. Chemical properties – inert nature, action of conc. H_2SO_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_2OH (g) $PhNHNH_2$ (h) 2,4-DNP (Schiff bases). Addition of H_2O 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

Unit I

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.
4. Chemistry of the elements by N.N.Greenwood and A. Earnshaw Pergamon Press1989.
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6. Inorganic Chemistry Principles of structure and reactivity by James E.Huhey, E.A. Keiter and R.L. Keiter 4th Edn.
7. Textbook of inorganic chemistry by R Gopalan.

Unit II

1. Organic Chemistry by Morrison and Boyd.
2. Organic Chemistry by Graham Solomons.
3. Organic Chemistry by Bruice Yuranis Powla.
4. Organic Chemistry by L. G. Wade Jr.
5. Organic Chemistry by M. Jones, Jr
6. Organic Chemistry by John McMurry.
7. Organic Chemistry by Soni.
8. General Organic chemistry by Sachin Kumar Ghosh.
9. Organic Chemistry by C N pillai

Unit III

1. Physical chemistry by P W Atkins
2. Principles of physical chemistry by Prutton and Marron.
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 $\Delta G = \Delta H - T\Delta S$. 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.

References

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

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1. Analytical chemistry by G. L. David Krupadanam, D. Vijaya Prasad, K. Varaprasada Rao, K.L.N. Reddy and C. Sudhakar

2. Principles of Inorganic Chemistry by Puri, Sharma and Kalia Vishal Publications(1996).
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Unit- II

1. Text book of organic chemistry by Soni. Sultan Chand & Sons; Twenty Ninth edition (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)
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6. Text book of organic chemistry by C N pillai CRC Press (2012)
7. Organic Chemistry by L. G. Wade Jr.
8. Organic Chemistry by M. Jones, Jr
9. 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 and 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. Colloidal and surface chemistry , M. Satake, Y. Hayashi, Y.Mido, S.A.Iqbal and
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)

Unit IV

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)**

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B.Sc. II yr CHEMISTRY
SEMESTER WISE SYLLABUS
SEMESTER IV
Paper-IV
Chemistry - IV

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 CO2 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 (SEC-I) (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 $FeCl_3$, 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 (SEC –II) (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 (SEC - IV) (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.

B.Sc. CBCS CHEMISTRY

Theory Model Question Paper

For

Semester I, II, III, IV

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

Note: Answer eight questions from Part-A and all questions from Part-B. Each question carries 4 marks in Part-A and 12 marks in Part-B.

Part-A **(8 x 4 = 32 Marks)**

(Short Answer Type)

I. Write any **Eight** questions of the following

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.

Part-B **(4 x 12 = 48 Marks)**

(Essay Answer Type)

II. Answer **all** Questions

1 a)

(OR)

b)

2 a)

(OR)

b)

3 a)

(OR)

b)

4 a)

(OR)

b)

B.Sc. CBCS CHEMISTRY

Practical Model Question Paper

For

Semester I, II, III, IV

Time : 3 Hrs. **Max.Marks : 50**

SEMESTER	External (Marks)	Internal (Marks)	Total (Marks)
I	40	10	50
II	40	10	50
III	40	10	50
IV	40	10	50

B.Sc. ZOOLOGY SYLLABUS UNDER CBCS 2019-20

B.Sc. ZOOLOGY I YEAR
SEMESTER-I
CORE PAPER – I
ANIMAL DIVERSITY – INVERTEBRATES

Instructions: 4 hr per week
No. of period: 60
No. of credits: 4

UNIT – I : **(15 Periods)**

1.1 Protozoa.

1.1.1 General characters and classification of Protozoa upto order levels with examples
1.1.2 Type study – *Elphidium*
1.1.3 Locomotion and Reproduction in Protozoa.
1.1.4 Epidemiology of Protozoan diseases - Amoebiasis; Giardiasis; Leishmaniasis and Malaria.

1.2 Porifera

1.2.1. General characters and classification of Porifera upto order levels with examples
1.2.2 Type study – *Sycon*
1.2.3 Canal system in sponges and Spicules.

UNIT – II: **(15 Periods)**

2.1. Cnidaria

2.1.1 General characters and classification of Cnidaria upto order levels with examples
2.1.2 Type study - *Obelia*
2.1.3 Polymorphism in Siphonophora
2.1.4 Corals and coral reef formation

2.2 Platyhelminthes

2.2.1 General characters
2.2.2 Classification of Platyhelminthes up to classes with examples
2.2.3 Type study- *Schistosoma*

2.3 Nemathelminthes

2.3.1 General characters
2.3.2 Classification of Nemathelminthes up to classes with examples
2.3.3 Type study - *Dracunculus*
2.3.4 Parasitic Adaptations in Helminthes

UNIT – III: **(15 Periods)**

3.1 Annelida

3.1.1 General characters
3.1.2 Classification of Annelida up to classes with examples
3.1.3 Type study - *Hirudinaria granulosa.*
3.1.4 Evolutionary significance of Coelome and Coelomoducts and metamerism

3.2 Arthropoda

3.2.1 General characters
3.2.2 Classification of Arthropoda up to classes with examples
3.2.3 Type study - Prawn
3.2.4 Crustacean larvae
3.2.5 Insect metamorphosis
3.2.6 *Peripatus* - Structure and affinities

UNIT – IV:

4.1 Mollusca **(15 Periods)**

4.1.1 General characters
4.1.2 Classification of Mollusca up to classes with examples
4.1.3 Type study - *Pila*
4.1.4 Pearl formation
4.1.5 Torsion and detorsion in gastropods

4.2 Echinodermata

4.2.1 General characters
4.2.2 Classification of Echinodermata up to classes with examples
4.2.3 Water vascular system in star fish
4.2.4 Echinoderm larvae and their significance

Suggested Readings:

1. **L.H. Hyman** *'The Invertebrates' Vol I, II and V.* – M.C. Graw Hill Company Ltd.
2. **Kotpal, R.L. 1988 - 1992** Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda, Mollusca, Echinodermata. Rastogi Publications, Meerut.
3. **E.L. Jordan and P.S.** Verma *'Invertebrate Zoology'* S. Chand and Company.
4. **R.D. Barnes** *'Invertebrate Zoology'* by: W.B. Saunders CO., 1986.
5. **Barrington. E.J.W.**, *'Invertebrate structure and Function'* by ELBS.
6 **P.S. Dhami and J.K. Dhami.** Invertebrate Zoology. S. Chand and Co. New Delhi.
7. **Parker, T.J. and Haswell** *'A text book of Zoology'* by, W.A., Mac Millan Co. London.
8. **Barnes, R.D. (1982).** *Invertebrate Zoology*, V Edition"

B.Sc. ZOOLOGY I YEAR
ZOOLOGY PRACTICAL SYLLABUS FOR I SEMESTER
CORE PAPER – I
ANIMAL DIVERSITY – INVERTEBRATES

Instructions: 3hr per week
No. of credits: 1

1. **Study of museum slides / specimens / models (Classification of animals up to orders)**
   - i. **Protozoa:** Amoeba, *Paramoecium, Paramoecium Binary fission and Conjugation, Vorticella, Entamoeba histolytica, Plasmodium vivax*
   - ii. **Porifera**: *Sycon, Spongilla, Euspongia, Sycon* - T.S & L.S, Spicules, Gemmule
   - iii. **Coelenterata:** *Obelia – Colony & Medusa, Aurelia, Physalia, Velella, Corallium, Gorgonia, Pennatula*
   - iv. **Platyhelminthes:** *Planaria, Fasciola hepatica, Fasciola* larval forms – Miracidium, Redia, Cercaria, *Echinococcus granulosus, Taenia solium, Schistosoma haematobium*
   - v. **Nemathelminthes:** *Ascaris(Male & Female), Drancunculus, Ancylostoma, Wuchereria*
   - vi. **Annelida:** *Nereis, Aphrodite, Chaetopteurs, Hirudinaria,* Trochophore larva
   - vii. **Arthropoda:** Cancer, Palaemon, Scorpion, *Scolopendra, Sacculina, Limulus, Peripatus,* Larvae - Nauplius, Mysis, Zoea, Mouth parts of male & female *Anopheles* and *Culex,* Mouthparts of Housefly and Butterfly.
   - viii. **Mollusca:** *Chiton, Pila, Unio, Pteredo, Murex, Sepia, Loligo, Octopus, Nautilus,* Glochidium larva
   - ix. **Echinodermata:** *Asterias, Ophiothrix, Echinus, Clypeaster, Cucumaria, Antedon,* Bipinnaria larva

2. **Dissections:**

   Prawn: Appendages, Digestive system, Nervous system, Mounting of Statocyst
   Insect Mouth Parts

3. **Laboratory Record work shall be submitted at the time of practical examination**

4. An **"Animal album"** containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose.

5. **Computer aided techniques should be adopted – show virtual dissections**

Suggested manuals:

1. Practical Zoology- Invertebrates S.S. Lal
2. Practical Zoology - Invertebrates P.S. Verma
3. Practical Zoology - Invertebrates K.P. Kurl

B.Sc. ZOOLOGY II YEAR
SEMESTER - IV
CORE PAPER – IV:
CELL BIOLOGY, GENETICS & DEVELOPMENTAL BIOLOGY

Instructions: 4hr per week
No. of period: 60
No. of credits: 4

UNIT – I: **(15 Periods)**

1. Cell Biology

1.1. Ultrastructure of animal cell
1.2. Structure and functions of plasma membrane proteins.
1.3. Structure and functions of cell organelles –Endoplasmic reticulum, Golgi body, Ribosomes, Lysosomes, centrosomes, Mitochondria and Nucleus
1.4. Chromosomes – Structure, types, giant chromosomes
1.5. Cell Division - Mitosis, Meiosis; Cell cycle and its regulation.

UNIT – II: **(15 Periods)**

2. Molecular Biology

2.1 DNA (Deoxyribo Nucleic Acid) – Structure and RNA (Ribo Nucleic Acid) - Structure, types
2.2 DNA Replication
2.3 Protein Synthesis – Transcription and Translation
2.4 Gene Expression – Genetic Code; operon concept
2.5 Molecular Biology Techniques- Polymerase Chain Reaction, Electrophoresis

UNIT – III: **(15 Periods)**

3. Genetics

3.1 Mendals laws of Inheritance and Non-Medelian Inheritance
3.2 Linkage and Crossing over
3.3 Sex determination and sex-linked inheritance
3.4 Chromosomal Mutations- Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy; Gene mutations- Induced versus Spontaneous mutations.
3.5 Inborn errors of metabolism.

UNIT – IV: **(15 Periods)**

4. Developmental Biology and Embryology

4.1 Gametogenesis (Spermatogenesis and Oogenesis) Fertilization; Types of eggs; Types of cleavages
4.2 Development of Frog up to formation of primary germ layers
4.3 Formation of Foetal membrane in chick embryo and their functions
4.4 Types and functions of Placenta in mammals
4.5 Regeneration in Turbellaria and Lizards

Suggested readings:

1. **Lodish, Berk, Zipursky, Matsudaria, Baltimore, Darnell** *'Molecular Cell Biology'* W.H. Free man and company New York..
2. **Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008).** *Principles of Genetics*. VIII Edition. Wiley India.
3. **Snustad, D.P., Simmons, M.J. (2009).** *Principles of Genetics*. V Edition. John Wiley and Sons Inc.

B.Sc. ZOOLOGY II YEAR PRACTICAL SYLLABUS
SEMESTER - IV
CORE PAPER – IV
CELL BIOLOGY, GENETICS & DEVELOPMENTAL BIOLOGY

Instructions: 3hr per week
No. of credits: 1

I. Cytology

1. Preparation and Identification of slides of Mitotic divisions with onion root tips
2. Preparation and Identification of different stages of Meiosis in Grasshopper Testes
3. Identification and study of the following slides
   i). Different stages of Mitosis and Meiosis
   ii) Lamp brush and Polytene chromosomes

II. Genetics

1. Problems on Genetics - Mendelian inheritance, Linkage and crossing over, Sex linked inheritance

III. Embryology

1. Study of T.S. of Testis and Ovary of a mammal
2. Study of different stages of cleavages (2, 4, 8, 16 cell stages); Morula, Blastula
3. Study of chick embryos of 18 hours, 24 hours, 33 hours and 48 hours of incubation

Laboratory Record work shall be submitted at the time of practical examination

An **"Album"** containing photographs, cut outs, with appropriate write-up about Genetics and Evolution.

Computer aided techniques should be adopted as per UGC guide lines.

Suggested manuals

1. Manual of laboratory experiments in cell biology Edward, G.
2. **Freeman & Bracegirdle,** An atlas of embryology

B.Sc. ZOOLOGY III YEAR
SEMESTER-V
PAPER – V(DSE – I): IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY

Instructions: 4hr per week
No. of period: 60
No. of credits: 4

UNIT-I: Basics of Immune system **(15 Periods)**

1.1 Cells of the immune system and the lymphoid organs(Primary and secondary).
1.2 First line of defenses-physical and chemical barriers; second line of defenses- inflammation and phagocytosis.
1.3 Types of immunity-Inherent(Active and passive) and acquired immunity(Active and passive) Humoral and cell mediated immunity
1.4 Major histocompatibility complex (MHC)–structure and function of class I and class II proteins.
1.5 Significance of MHC in organ tranaplantation.MHC restriction

UNIT-II: Antibodies and Antigens and Immune system diseases **(15 Periods)**

2.1 Antibodies/immunoglobulins- structure, functions and classification, antibody diversity, Monoclonal antibodies and applications.
2.2 Antigens structure, antigenic determinants/epitopes, haptens, adjuvants and antigenicity.
2.3 Antigen-antibody reactions-agglutination, precipitation, opsonization, cytotoxicity
2.4 Hypersensitivity reactions
2.5 Autoimmunity and Immunodeficiency diseases.

UNIT – III: Animal Biotechnology and Genetically modified organisms **(15 Periods)**

3.1 Concept and Scope of Animal Biotechnology.
3.2 Recombinant DNA technology and its applications.
3.3 Cloning vectors - Plasmids, Cosmids and shuttle vectors; Cloning methods (Cell, Animal and Gene cloning).
3.4 Transgenesis – Methods of Transgenesis.
3.5 Production of Transgenic animals - sheep and fish.

UNIT –IV: Applications of Biotechnology **(15 Periods)**

4.1 In vitro fertilization and embryo transfer.
4.2 Hybridoma technology – concepts and applications.
4.3 Stem cells –types and their applications.
4.4 Biopesticides; *Bacillus thuringiensis* – mode of action of toxin.
4.5 Animal Bioreactors – concepts and applications.

Reference Books:

1. Text book of immunology-Ivan Riott
2. Text book of immunology-C.V.Rao
3. Text book of immunology-Nandini shetty
4. Text book of immunology-Kubey
5. Culture of Animal cells. R. Ian Freshney, Wiley Liss.
6. Biotechnology – S. Mitra.
7. Animal Cell culture – Practical Approach – Ed. John R W Masters, Oxford.
8. Biotechnology – B. D. Singh

B.Sc. ZOOLOGY III YEAR PRACTICAL SYLLABUS
SEMESTER-V
PAPER – V(DSE – I): IMMUNOLOGY AND ANIMAL BIOTECHNOLOGY

Instructions: 3hr per week
No. of credits: 1

I. Immunology

1. Demonstration of agglutination(ABO-blood grouping/Widal test) using kit
2. Demonstration of precipitation(VDRL/RPR test)using kit
3. Radial immunodiffusion using kit.
4. Histology of lymphoid organs-Spleen, Thymus, Lymphnode, Bone marrow.

II. Animal Biotechnology

1. Study the following techniques through photographs / virtual lab
   a. Identification of Vectors
   b. Identification of Transgenic animals
   c. DNA sequencing (Sanger's method)
   d. DNA finger printing
   e. Southern blotting
   f. Western blotting

2. PCR demonstration /virtual lab

- **Laboratory Record work shall be submitted at the time of practical examination**
- **Computer aided techniques should be adopted as per UGC guide lines.**

Reference Books:

1. A hand book of practical immunology-Ivan Riott
2. Animal Biotechnology – PK Gupta