SRI DNR GDC(W) PALAKOL

SYLLABUS 2020-2021

UG PROGRAM (4 Year Honors)
2020-21

As per the metric 1.2.1,

We wish to inform you that the following six programmes are running in this institution affiliated to Adi Kavi Nannaya University,Rajamundry.

Programme Code	Programme name	Year of Introduction	Status of implemetation of CBCS / elective course system (Yes/No)	Year of implemetation of CBCS / elective course system
81	BCOM GENERAL	1982	2015-16	2015-16
82	BCOM(CA)	2019	2019-20	2019-20
62/01	BA(HEP)	1982	2015-16	2015-16
71/01	BSC (MPC)	1982	2015-16	2015-16
71/02	BSC (MPCS)	2007	2015-16	2015-16
71/10	BSC (BZC)	2009	2015-16	2015-16

The university affiliation order along with syllabus is enclosed as supporting documents to this metric. The same is available in the college website. In addition to this all the departments are conducting certificate courses in their concerned subjects.

SRI DNR GDC(W) PALAKOL

B.Sc/B.A/B.Com
ENGLISH

DETAILS OF COURSE TITLES & CREDITS

Sem	Course no.	Course Name	Course type (T/L/P)	Hrs./Week	Credits	Max.Marks Cont/ Internal/Mid Assessment	Max. Marks Sem-end Exam
I	1	A Course in Communication and Soft Skills	T	4	3	25	75
II	2	A Course in Reading &Writing Skills	T	4	3	25	75
III	3	A Course in Conventional Skills	T	4	3	25	75

SRI DNR GDC(W) PALAKOL

UG(English)	Semester - I	Credits: 03
Course - 1	A Course In Communication And Soft Skills	Hrs/Week: 04

Learning Outcomes:

By the end of the course the learner will be able to :

- Use grammar effectively in writing and speaking.
- Demonstrate the use of good vocabulary
- Demonstrate an understating of writing skills
- Acquire ability to use Soft Skills in professional and daily life.
- Confidently use the tools of communication skills

UNIT I: Listening Skills

i. Importance of Listening
ii. Types of Listening
iii. Barriers to Listening
iv. Effective Listening

UNIT II: Speaking Skills

a. Sounds of English: Vowels and Consonants
b. Word Accent
c. Intonation

UNIT III: Grammar

a) Concord
b) Modals
c) Tenses (Present/Past/Future)
d) Articles
e) Prepositions
f) Question Tags
g) Sentence Transformation (Voice, Reported Speech & Degrees of Comparison)
h) Error Correction

UNIT IV: Writing

v. Punctuation
vi. Spelling
vii. Paragraph Writing

UNIT V: Soft Skills

a. SWOC
b. Attitude
c. Emotional Intelligence
d. Telephone Etiquette
e. Interpersonal Skills

SRI DNR GDC(W) PALAKOL

UG(English)	Semester -II	Credits: 03
Course - 2	A Course In Reading & Writing Skills	Hrs/Week: 04

Learning Outcomes:
By the end of the course the learner will be able to :

- Use reading skills effectively
- Comprehend different texts
- Interpret different types of texts
- Analyse what is being read
- Build up a repository of active vocabulary
- Use good writing strategies
- Write well for any purpose
- Improve writing skills independently for future needs

UNIT I:

Prose : 1. How to Avoid Foolish Opinions Bertrand Russell
Skills : 2. Vocabulary: Conversion of Words
: 3. One Word Substitutes
: 4. Collocations

UNIT II:

Prose : 1. The Doll's House Katherine Mansfield
Poetry : 2. Ode to the West Wind P B Shelley
Non-Detailed Text : 3. Florence Nightingale Abrar Mohsin
Skills : 4. Skimming and Scanning

UNIT III:

Prose : 1. The Night Train at Deoli Ruskin Bond**Poetry** : 2. Upagupta Rabindranath Tagore
Skills : 3. Reading Comprehension
: 4. Note Making/Taking

UNIT IV

Poetry : 1. Coromandel Fishers Sarojini Naidu
Skills : 2. Expansion of Ideas
: 3. Notices, Agendas and Minutes

UNIT V:

Non-Detailed Text : 1. An Astrologer's Day R K Narayan
Skills : 2. Curriculum Vitae and Resume
: 3. Letters
: 4. E-Correspondence

SRI DNR GDC(W) PALAKOL

UG(English)	Semester -III	Credits: 03
Course - 3	A Course In Conversational Skills	Hrs/Week: 04

Learning Outcomes

By the end of the course the learner will be able to :

- Speak fluently in English
- Participate confidently in any social interaction
- Face any professional discourse
- Demonstrate critical thinking
- Enhance conversational skills by observing the professional interviews

UNIT I:

Speech : 1. Tryst with Destiny Jawaharlal Nehru
Skills : 2. Greetings
: 3. Introductions

UNIT II:

Speech : 1. Yes, We Can Barack Obama
Interview : 2. A Leader Should Know How to Manage Failure Dr.A.P.J.Abdul Kalam/ India Knowledge at Wharton
Skills : 3. Requests

UNIT III:

Interview : 1. Nelson Mandela's Interview With Larry King
Skills : 2. Asking and Giving Information
: 3. Agreeing and Disagreeing

UNIT IV:

Interview : 1. JRD Tata's Interview With T.N.Ninan
Skills : 2. Dialogue Building
: 3. Giving Instructions/Directions

UNIT V:

1. **Speech** : 1. You've Got to Find What You Love Steve Jobs
Skills : 2. Debates
: 3. Descriptions
: 4. Role Play

SRI DNR GDC(W) PALAKOL

B.Sc/B.A/B.Com
TELUGU

Subject Curricular Framework

Sem	Course	Title	Hrs/Wk	Credits	Max. Marks IA	SE	Total
I	I	Pracheena Telugu Kavithvam	04	03	25	75	100
II	II	Aadhunika Telugu Sahithyam	04	03	25	75	100
III	III	Srujanaathmaka Rachana	04	03	25	75	100

పాత్యప్రణాళిక (3 కోర్సులు)

సెమి.	కోర్సు	శీర్షిక	పీరియడ్లు/వారానికి	క్రెడిట్లు	మొత్తం మార్కులు		
I	I	ప్రాచీన తెలుగు కవిత్వం	04	03	25	75	100
II	II	ఆధునిక తెలుగు సాహిత్యం	04	03	25	75	100
III	III	సృజనాత్మక రచన	04	03	25	75	100

బి.ఏ., బి.కాం., బి.యస్‌సి., తదితర ప్రోగ్రాములు

అంశం: జనరల్ తెలుగు సెమిస్టర్-1

కోర్సు-1 : ప్రాచీన తెలుగు కవిత్వం

యూనిట్ల సంఖ్య:5 పీరియడ్ల సంఖ్య:60

✦ **అభ్యసన ఫలితాలు:-**

ఈ కోర్సు విజయవంతంగా ముగించాక, విద్యార్థులు క్రింది అభ్యసన ఫలితాలను పొందగలరు.

1. ప్రాచీన తెలుగుసాహిత్యం యొక్క ప్రాచీనతను, విశిష్టతను గుర్తిస్తారు. తెలుగుసాహిత్యంలో ఆదికవి నన్నయ కాలంనాటి భాషాసంస్కృతులను, ఇతిహాసకాలం నాటి రాజనీతి విషయాలపట్ల పరిజ్ఞానాన్ని సంపాదించగలరు.

2. శివకవుల కాలంనాటి మతపరిస్థితులను, భాషావిశేషాలను గ్రహిస్తారు. తెలుగు నుడికారం, సామెతలు, లోకోక్తులు మొదలైన భాషాంశాల పట్ల పరిజ్ఞానాన్ని పొందగలరు.

3. తిక్కన భారతంనాటి మత, ధార్మిక పరిస్థితులను, తిక్కన కవితాశిల్పాన్ని, నాటకీయతను అవగాహన చేసుకోగలరు.

4. ఎఱ్ఱన సూక్తివైచిత్రిని, ఇతిహాస కవిత్వంలోని విభిన్న రీతులపట్ల అభిరుచిని పొందగలరు. శ్రీనాథుని కాలం నాటి కవితావిశేషాలను, మొల్ల కవితా విశిష్టతను గుర్తించగలరు.

5. తెలుగు పద్యం స్వరూప-స్వభావాలను, సాహిత్యాభిరుచిని పెంపొందించుకుంటారు. ప్రాచీన కావ్యభాషలోని వ్యాకరణాంశాలను అధ్యయనం చేయడం ద్వారా భాషాసామర్థ్యాన్ని, రచనల మెళకువలను గ్రహించగలరు.

పాఠ్య ప్రణాళిక

యూనిట్–I

రాజనీతి – నన్నయ

మహాభారతం–సభాపర్వం–ప్రథమాశ్వాసం–(26–57 పద్యాలు)

యూనిట్–II

దక్షయజ్ఞం – నన్నెచోడుడు

కుమారసంభవం–ద్వితీయాశ్వాసం–(49–86 పద్యాలు)

యూనిట్–III

ధౌమ్య ధర్మోపదేశము – తిక్కన

మహాభారతం–విరాటపర్వం–ప్రథమాశ్వాసం–(116–146) పద్యాలు

యూనిట్–IV

పలనాటి బెబ్బులి – శ్రీనాథుడు (పలనాటి వీరచరిత్ర–ద్విపద కావ్యం పుట 108–112 'బాలచంద్రుడు భీమంబగు సంగ్రామం బొనర్చుట.. (108).. ..... వెఱగంది కుంది' (112) సం. అక్కిరాజు ఉమాకాంతం ముద్రణ.వి.కె.స్వామి, బెజవాడ 1911.

యూనిట్–V

సీతారావణ సంవాదం – మొల్ల

రామాయణము–సుందరకాండము–(40–87 పద్యాలు)

✦వ్యాకరణం

సంధులు: ఉత్వ, త్రిక, ద్రుతప్రకృతిక, నుగాగమ,ద్విరుక్తటకారాదేశ, యణాదేశ, వృద్ధి, శ్చుత్వ, జశ్త్వ, అనునాసిక సంధులు.

సమాసాలు: అవ్యయీభావ, తత్పురుష, కర్మధారయ, ద్వంద్వ, ద్విగు, బహువ్రీహి.

అలంకారాలుఃఅర్థాలంకారాలు ఃఉపమ, ఉత్ప్రేక్ష, రూపక, స్వభావోక్తి, అర్థాంతరవ్యాస, అతిశయోక్తి.

శబ్దాలంకారాలు ఃఅనుప్రాస (వృత్యనుప్రాస, ఛేకానుప్రాస లాటానుప్రాస, అంత్యానుప్రాస)

ఛందస్సు

వృత్తాలు: ఉత్పలమాల, చంపకమాల, శార్దూలము, మత్తేభము;

జాతులు : కందం, ద్విపద; ఉపజాతులు : ఆటవెలది, తేటగీతి, సీసం మరియు ముత్యాలసరాలు

బి.ఏ., బి.కాం., బి.యస్‌సి., తదితర ప్రోగ్రాములు

అంశం: జనరల్ తెలుగు సెమిస్టర్-2

కోర్సు-2 : ఆధునిక తెలుగు సాహిత్యం

యూనిట్ల సంఖ్య:5 పీరియడ్ల సంఖ్య:60

✦ **అభ్యసన ఫలితాలు:-**

ఈ కోర్సు విజయవంతంగా ముగించాక, విద్యార్థులు క్రింది అభ్యసన ఫలితాలను పొందగలరు.

1. ఆంగ్లభాష ప్రభావం కారణంగా తెలుగులో వచ్చిన ఆధునిక సాహిత్యాన్ని ... గుర్తిస్తారు.

2. సమకాలీన ఆధునిక సాహిత్య ప్రక్రియలైన "వచన కవిత్వం, కథ, నవల, నాటకం, విమర్శ"లపై అవగాహన పొందుతారు.

3. భావకవిత, అభ్యుదయ కవితాలక్ష్యాలను గూర్చిన జ్ఞానాన్ని పొందుతారు.అస్తిత్వవాద ఉద్యమాలపుట్టుకను, ఆవశ్యకతను గుర్తిస్తారు.

4. కథాసాహిత్యం ద్వారా సామాజిక చైతన్యాన్ని పొందుతారు. సిద్ధాంతాల ద్వారా కాకుండా, వాస్తవ పరిస్థితులను తెలుసుకోవడం ద్వారా సిద్ధాంతాన్ని సమీక్షించగలరు.

5. ఆధునిక తెలుగు కల్పనాసాహిత్యం ద్వారా సామాజిక, సాంస్కృతిక,రాజకీయ చైతన్యాన్ని పొందుతారు.

పాఠ్య ప్రణాళిక

యూనిట్-I : ఆధునిక కవిత్వం

1. ఆధునిక కవిత్వం- పరిచయం
2. కొండవీడు - దువ్వూరి రామిరెడ్డి
   ('కవికోకిల' గ్రంథావళి-ఖండకావ్యాలు-నక్షత్రమాల సంపుటి నుండి)
3. మాతృసంగీతం - అనిసెట్టి సుబ్బారావు ('అగ్నివీణ' కవితాసంపుటి నుండి)
4. 'తాతకో నూలుపోగు' - బండారు ప్రసాదమూర్తి ('కలనేత' కవితాసంపుటి నుండి)

యూనిట్-II : కథానిక

5. తెలుగు కథానిక - పరిచయం
6. భయం (కథ) - కాళీపట్నం రామారావు
7. స్వేదం ఖరీదు....? - (కథ) - రెంటాల నాగేశ్వరరావు

యూనిట్-III : నవల

8. తెలుగు 'నవల' - పరిచయం
9. రథచక్రాలు (నవల) - మహీధర రామ్మోహన రావు (సంక్షిప్త ఇతివృత్తం మాత్రం)
10. రథచక్రాలు (సమీక్షా వ్యాసం) - డా॥ యల్లాప్రగడ మల్లికార్జునరావు

యూనిట్-IV: నాటకం

11. తెలుగు 'నాటకం' - పరిచయం
12. యక్షగానము (నాటిక) - ఎం.వి.ఎస్. హరనాథరావు.
13. "అపురూప కళారూపాల విధ్వంసదృశ్యం 'యక్షగానము' (సమీక్షా వ్యాసం)"
    -డా॥కందిమళ్ళసాంబశివరావు

యూనిట్-V: విమర్శ

14. తెలుగు సాహిత్య విమర్శ - పరిచయం
15. విమర్శ-స్వరూప స్వభావాలు; ఉత్తమ విమర్శకుడు-లక్షణాలు

బి.ఏ., బి.కాం., బి.యస్‌సి., తదితర ప్రోగ్రాములు

అంశం: జనరల్ తెలుగు సెమిస్టర్-3

కోర్సు-3 : సృజనాత్మక రచన

యూనిట్ల సంఖ్య:5 **పీరియడ్ల సంఖ్య:60**

✦ **అభ్యసన ఫలితాలు:-**

ఈ కోర్సు విజయవంతంగా ముగించాక, విద్యార్థులు క్రింది అభ్యసన ఫలితాలను పొందగలరు.

1. తెలుగు సాహిత్య అభ్యసన ద్వారా నేర్చుకున్న నైపుణ్యాలను, సృజనాత్మక నైపుణ్యాలుగా మార్చుకోగలరు.
2. విద్యార్థులు భాషాతత్వాన్ని, భాష యొక్క ఆవశ్యకతను, భాష యొక్క ప్రాధాన్యాన్ని గుర్తిస్తారు. మనిషి వ్యక్తిగత జీవనానికి, సామాజికవ్యవస్థ పటిష్టతకు భాష ప్రధానమని తెలుసుకుంటారు. తెలుగుభాషలోని కీలకాంశాలైన 'వర్ణం-పదం-వాక్యా'ల ప్రాధాన్యాన్ని గుర్తిస్తూ, వాగ్రూప- లిఖితరూప వ్యక్తీకరణ ద్వారా భాషానైపుణ్యాలను మెరుగుపరచుకోగలరు.
3. భాషానైపుణ్యాలను అలవరచుకోవడంతోపాటు వినియోగించడం నేర్చుకుంటారు. రచనా, భాషణానైపుణ్యాలను సృజనాత్మక రూపంలో వ్యక్తీకరించగలరు.
4. ప్రాచీన పద్యరచనతో పాటు ఆధునిక కవిత, కథ, వ్యాసం, మొదలైన సాహిత్యప్రక్రియల నిర్మాణాలకు సంబంధించిన సిద్ధాంతవిషయాలను నేర్వడంతో పాటు వారిలో రచనా నైపుణ్యాలను పెంపొందించుకోగలరు.
5. సృజన రంగం, ప్రసారమాధ్యమ రంగాల్లో ఉపాధి అవకాశాలను అందిపుచ్చుకోగలరు.
6. అనువాద రంగంలో నైపుణ్యం సంపాదించగలరు.

పాఠ్య ప్రణాళిక

యూనిట్-I: వ్యక్తీకరణ నైపుణ్యాలు

1. భాష-ప్రాథమికాంశాలు: భాష-నిర్వచనం, లక్షణాలు, ఆవశ్యకత, ప్రయోజనాలు
2. వర్ణం-పదం-వాక్యం', వాక్య లక్షణాలు, సామాన్య-సంయుక్త-సంశ్లిష్టవాక్యాలు
3. భాషా నిర్మాణంలో 'వర్ణం-పదం-వాక్యం' ప్రాధాన్యత

యూనిట్-II సృజనాత్మక రచన

4. కవితా రచన : ఉత్తమ కవిత - లక్షణాలు
5. కథారచన : ఉత్తమ కథ - లక్షణాలు
6. వ్యాస రచన : ఉత్తమ వ్యాసం-లక్షణాలు

యూనిట్-III: అనువాద రచన

7. అనువాదం-నిర్వచనం, అనువాద పద్ధతులు,
8. అనువాద సమస్యలు-భౌగోళిక,భాషా,సాంస్కృతిక సమస్యలు, పరిష్కారాలు
9. అభ్యాసము : ఆంగ్లం నుండి తెలుగుకు,తెలుగు నుండి ఆంగ్లానికి ఒక పేరానుఅనువదించడం

యూనిట్ IV మాధ్యమాలకు రచన-1 (ముద్రణామాధ్యమం/ప్రింట్ మీడియా)

10. ముద్రణామాధ్యమం (అచ్చుమాధ్యమం) : పరిచయం, పరిధి, వికాసం
11. వివిధ రకాల పత్రికలు-పరిశీలన, పత్రికాభాష, శైలి, వైవిధ్యం
12. పత్రికా రచన : వార్తా రచన, సంపాదకీయాలు, సమీక్షలు-అవగాహన

యూనిట్ V మాధ్యమాలకు రచన-2 (ప్రసార మాధ్యమం/ఎలక్ట్రానిక్ మీడియా)

13. ప్రసారమాధ్యమాలు : నిర్వచనం, రకాలు, విస్తృతి, ప్రయోజనాలు
14. శ్రవణ మాధ్యమాలు - రచన: రేడియో రచన, ప్రసంగాలు, నాటికలు, ప్రసార సమాచారం
15. దృశ్యమాధ్యమాలు - రచన: వ్యాఖ్యానం (యాంకరింగ్), టెలివిజన్ రచన

SRI DNR GDC(W) PALAKOL

B.Sc / B.A/ B.Com
General HINDI

DETAILS OF COURSE TITLES & CREDITS

Sem	Course no.	Course Name	Course type (T/L/P)	Hrs./Week	Credits	Max.Marks Cont/ Internal/Mid Assessment	Max. Marks Sem-end Exam
I	1	Prose, Short Stories, Grammar and Letter Writing	T	4	3	25	75
II	2	Prose, Short Stories, Grammar and Letter Writing	T	4	3	25	75
III	3	Old and Modern Poetry, History of Hindi Literature ,Essays (Translation and Functional Hindi)	T	4	3	25	75
IV	4	Old and Modern Poetry, History of Hindi Literature ,Essays (Translation and Functional Hindi)	T	4	3	25	75

SRI DNR GDC(W) PALAKOL

UG(General HINDI)	Semester - I	Credits:03
Course :1	Prose, Short Stories, Grammar and Letter Writing	Hrs/Weeks:04

UNIT 1

गद्य संदेश (Prose)(सं. डा .वी. एल. नरसिंहम शिवकोटि)

1. साहित्य की महत्ता
2. मित्रता
3. पुथ्वीराज की ऑखें

UNIT 2

कथा लोक (Short Stories)(सं. डा. घनश्याम)

1. मुक्तिधन
2. गूदडसाई
3. उसने कहा था

UNIT 3

व्याकरण (Grammar)(सरल हिन्दी व्याकरण.. दक्षिण भारत हिन्दी प्रचार सभा..मद्रास)

लिंग, वचन, काल, वाच्य।

UNIT 4

कार्यालयीन शब्दावली : अंग्रेजी से हिंदी और हिंदी से अंग्रजी

(Changing Administrative Terminology Hindi to English and English to Hindi)

UNIT 5

पत्र लेखन : वैयक्तिक पत्र(छुट्टी पत्र, पिता, मित्र के नाम पत्र, पुस्तक विकेता के नाम पत्र

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Unit 1

गद्य संदेश (Prose) (सं. डा.वी.एलण्नरसिंहम शिवकोटि)

1. बिंदा

2. भारत एक है

3.एच.आई.वी / एड्स

Unit 2

कथा लोक (Short Stories) (सं. डा. घनश्याम)

1.भूख हडताल

2.परमात्मा का कुत्ता

3.और वह पढ गई...

Unit 3

व्याकरण (Grammar) (सरल हिन्दी व्याकरण.. दक्षिण भारत हिन्दी प्रचार सभा..मद्रास)

संधि विच्छेद, वाक्यों की शुद्धि

Unit 4

कार्यालयीन हिंदी : पदनाम ... हिंदी से अंग्रेजी और अंग्रेजी से हिंदी

(Changing Administrative Terminology Hindi to English and English to Hindi)

Unit 5

पत्र लेखन : (Letter Writing)

नौकरी केलिए आवेदन पत्र

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SRI DNR GDC(W) PALAKOL

UG(General HINDI)	Semester III	Credits:03
Course : 3	Old and Modern Poetry, History of Hindi Literature ,Essays (Translation and Functional Hindi)	Hrs/Weeks:04

Unit 1

1. काव्यदीप **(Ancient and Modern Poetry)** (सं.बी.राधाकृष्णमूर्ति)

साखी...1..10 दोहे

सूरदास...बाल वर्णन

मातृभूमि...मैथिलीशरण गुप्त

तोडती पत्थर...सूर्यकांत त्रिपाठी निराला

भारतमाता...सुमित्रानंदन पंत

Unit 2

2. हिंदी साहित्य का इतिहास **(History of Hindi Literature)** (डा. बाबू गुलाबराय)

हिंदी साहित्य का काल विभाजन (डा. रामचन्द्र शुक्ल)

भक्तिकाल की विशेषताएँ

ज्ञानाश्रयी शाखा ... कबीर

प्रेमाश्रयी शाखा ... जायसी

Unit 3

3. निबंध **(General Essays)**

1.समाचार पत्र 2.बेकारी समस्या

3.पर्यावरण और प्रदूषण 4. साहित्य और समाज

Unit 4

4. अनुवाद **(Translation)** अंग्रेजी से हिंदी **(Five Simple Sentences)**

Unit 5

5. प्रयोजनमूलक हिंदी **(Functional Hindi)**

राष्ट्रभाषा, राजभाषा, संपर्क भाषा

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Unit 1

1. काव्यदीप **(Ancient and Modern Poetry)** (सं.बी.राधाकृष्णमूर्ति)

1.रहीम.....1..10 दोहे

2. मातृभाषा के प्रति...भारतेंदु हरश्चद्र

3. गीत फरोश...भवानी प्रसाद मिश्र

4.ढूँठ ... आलूरि बैरागी चौधरी

5. मादा भ्रूण...रजनी तिलक

Unit 2

2. हिंदी साहित्य का इतिहास **(History of Hindi Literature)**(डा. बाबू गुलाबराय)

भक्तिकाल .... स्वर्णयुग

रामभक्ति शखा....तुलसीदास

कृष्णभक्ति शाखा... सूरदास

Unit 3

3. साधारण निबंध **(General Essays)**

1.कंप्यूटर 2.विद्यार्थी और राजनीति

3.विज्ञान से हानि लाभ 4. समाज में नारी का स्थान

Unit 4

4. अनुवाद **(Translation)** तेलुगु से हिंदी **(Five Simple Sentences)**

Unit 5

5. प्रयोजनमूलक हिंदी **(Functional Hindi)**

ज्ञापन, परिपत्र, सूचना

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SRI DNR GDC(W) PALAKOL

LIFE SKILL COURSES
AND
SKILL DEVELOPMENTCOURSES

1. LIFE SKILL AND SKILL DEVELOPMENT COURSES

Life /Skill development courses: 4 courses of LSC and 4 courses of SDC with options

Each course of 2 hrs/ week containing 3 units of syllabi for 30 hrs teaching with 2 credits based on 50 marks evaluation. No internal assessment. University sem-end exam:50 marks (2 Hrs)

Question paper would be in two sections (Section A and Section B) for 50 marks

Section A consisting of 8 questions covering two questions from each unit and the remaining to be fromany unit. Student has to write 4 questions and each question carries 5 marks (i.e., 5 X 4 = 20 marks). Each question to be answered with 5-7 points/10-15 lines of answer with necessary diagram/equations/ figure/flow charts, if necessary.

Section B consisting of 6 questions covering all units (i.e., from each unit two questions to be given with either or choice). Student has to write 3 questions and Each question carries 10 marks. (i.e., 10 X 3 = 30 marks). Each question to be answered with 10 to 15 points or 20 to 35 lines along with diagrams/equations/ figure/flow charts, if necessary.

List of Life Skill courses

Sem	No. of Courses	Course Name	Preferred teaching department
I	1	Human Values and Professional Ethics (HVPE)	English/Telugu/Any Dept
		Entrepreneurship Development (ED)	Commerce
		Basic Computer applications (from 2021-22 admitted batches)	Computers
II	1	Information and Communication Technology (ICT)	Computers
		Indian Culture and Science (ICS)	History/Telugu
III	Compulsory	Environmental Education (EE)	Botany/Zoology/Environmental Science/ Any dept.
	1	Personality Development and Leadership (PDL)	English/Any Dept
		Analytical Skills (AS)	Maths/Statistics

SRI DNR GDC(W) PALAKOL

List of Skill Development Courses along with their Semester-wise allotment with choices.

SEM	No. of courses	Names of courses		Preferred teaching department
I	One	1. Tourism Guidance (or)		History/Any dept
		2. Plant Nursery (or)		Botany
		3. Electrical Appliances (or)		Physics
		4. Insurance Promotion		Commerce
II	Two (1 from A group and 1 from B Group)	'A' Group	1. Survey & Reporting (or)	Economics/History
			2. Business communication (or)	English
			3. Solar Energy (or)	Physics
			4. Agricultural Marketing	Commerce/Economics
		'B' Group	1. Social Work Methods (or)	Political science/social work
			2. Advertising (or)	Commerce
			3. Dairy Technology (or)	Zoology
			4. Performing Arts	Telugu
III	one	1. Disaster Management (or)		English/Telugu/Any dept
		2. Online Business (or)		Commerce
		3. Poultry Farming (or)		Zoology
		4. Financial Markets		Economics/Commerce

UG- LIFE SKILL COURSE

HUMAN VALUES AND PROFESSIONAL ETHICS (HVPE)

(w.e.f. 2020-2021 A.Y.)

Semester	Course Code (LS)	Course Title	Hrs/Sem	Hrs/wk	Credits	Sem End Exam (2 hrs)
I	Life skill course	Human values and professional ethics (HVPE)	30	2	2	50 Marks

Objective: Learning Outcome: On completion of this course, the UG students will be able to

- Understand the significance of value inputs in a classroom and start applying them in their life and profession
- Distinguish between values and skills, happiness and accumulation of physical facilities, the Self andthe Body, Intention and Competence of an individual, etc.
- Understand the value of harmonious relationship based on trust and respect in their life andprofession
- Understand the role of a human being in ensuring harmony in society and nature.
- Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.

UNIT: 1 - Introduction – Definition, Importance, Process & Classifications of Value Education: Understanding the need, basic guidelines, content and process for Value Education Understanding the thought provoking issues; need for Values in our daily life Choices making – Choosing, Cherishing & Acting, Classification of Value Education: understanding Personal Values, Social Values, Moral Values & Spiritual Values.

UNIT: 2 - Harmony in the Family – Understanding Values in Human Relationships: Understanding harmony in the Family- the basic unit of human interaction, Understanding the set ofproposals to verify

the Harmony in the Family; Trust (*Vishwas*) and Respect (*Samman*) as thefoundational values of relationship, Present Scenario: Differentiation (Disrespect) in relationships on thebasis of body, physical facilities, or beliefs.
Understanding the Problems faced due to differentiation in Relationships. Understanding the harmony inthe society (society being an extension of family): *Samadhan*, *Samridhi*, *Abhay*, *Sah-astitva* as comprehensive Human Goals Visualizing a universal harmonious order in society- Undivided Society (*AkhandSamaj*), Universal Order (*SarvabhaumVyawastha*)- from family to world family.

UNIT: 3 - Professional Ethics in Education: Understanding about Professional Integrity, Respect & Equality, Privacy, Building Trusting Relationships.Understanding the concepts; Positive co-operation, Respecting the competence of other professions. Understanding about Taking initiative and Promoting the culture of openness. Depicting Loyalty towards Goals and objectives.

UG- LIFE SKILL COURSE

INDIAN CULTURE AND SCIENCE(ICS)

(w.e.f. 2020-2021 A.Y.)

Semester	Course Code (LS)	Course Title	Hrs/Sem	Hrs/wk	Credits	Sem End Exam(2 Hrs)
II	Life skill course	Indian culture and science(ICS)	30	2	2	50 Marks

Learning Outcomes: By successful completion of the course, students will be able to:

- Understand the evolution of India's culture
- Analyze the process of modernization of Indian society and culture from past to future
- Comprehend objective education and evaluate scientific development of India in variousspheres
- Inculcate nationalist and moral fervour and scientific temper

Unit – I: Unity in Diversity in India: (09 hrs)

Coexistence of various religions since ancient times - Hinduism, Buddhism, Jainism and

Atheism, and later Sikhism, Islam and Christianity The Bhakti (Vishnavite and Saivaite) and Sufi Movements. The concepts of seela, karuna, kshama, maitri, vinaya, santhi and ahimsa Achievements in Literature, Music, Dance, Sculpture and Painting - Craftsmanship in cloth, wood, clay, metal and ornaments Cultural diversity, Monogamy, Family system, Important seasonal festivals

Unit – II: Social Reforms and Modern Society: (09 hrs)

Reforms by Basaveswara - Raja Rama Mohan Roy – Dayananda Saraswathi –Swamy Vivekananda
–Mahatma Gandhi - B. R. Ambedkar - Reforms in Andhra by Vemana,Veerabrahmam, Gurajada, Veeresalingam and Gurram Jashua (only reforms in brief, biographies not needed). Modern Society: Family unity, Community service, Social Harmony, Civic Sense, Gender Sensitivity, Equality, National Fervor

Unit – III: Science and Technology: (11 hrs)

Objectivity and Scientific Temper – Education on Scientific lines (Bloom's Taxonomy) - Online Education. Developments in Industry, Agriculture, Medicine, Space, Alternate Energy, Communications, Media through ages

UG- LIFE SKILL COURSE

ENVIRONMENTAL EDUCATION (EE) (Mandatory)

(w.e.f. 2020-2021 A.Y.)

Semester	Course Code (LS)	Course Title	Hrs/Sem	Hrs/wk	Credits	Sem End Exam (2 Hrs)
III	Life skill course	Environmental Education(EE)	30	2	2	50 Marks

Course objective: A Generic Course intended to create awareness that the life of human beings is anintegral part of environment and to inculcate the skills required to protect environment from all sides.

Learning outcomes: On completion of this course the students will be able to …..

- Understand the nature, components of an ecosystem and that humans are an integral part ofnature.
- Realize the importance of environment, the goods and services of a healthy biodiversity,dependence of humans on environment.
- Evaluate the ways and ill effects of destruction of environment, population explosion onecosystems and global problems consequent to anthropogenic activities.
- Discuss the laws/ acts made by government to prevent pollution, to protect biodiversity andenvironment as a whole.
- Acquaint with international agreements and national movements, and realize citizen's role inprotecting environment and nature.

Unit 1: Environment and Natural Resources: (06hrs)

1. Multidisciplinary nature of environmental education; scope and importance.
2. Man as an integral product and part of the Nature.
3. A brief account of land, forest and water resources in India and their importance.
4. Biodiversity: Definition; importance of Biodiversity - ecological, consumptive, productive, social,ethical and moral, aesthetic, and option value.
5. Levels of Biodiversity: genetic, species and ecosystem diversity.

Unit-2: Environmental degradation and impacts: (10hrs)

1. Human population growth and its impacts on environment; land use change, land degradation, soilerosion and desertification.
2. Use and over-exploitation of surface and ground water, construction of dams, floods, conflicts overwater (within India).
3. Deforestation: Causes and effects due to expansion of agriculture, firewood, mining, forest fires andbuilding of new habitats.
4. Non-renewable energy resources, their utilization and influences.
5. A brief account of air, water, soil and noise pollutions; Biological, industrial and solid wastes inurban areas. Human health and economic risks.
6. Green house effect - global warming; ocean acidification, ozone layer depletion, acid rains andimpacts on human communities and agriculture.
7. Threats to biodiversity: Natural calamities, habitat destruction and fragmentation, over exploitation,hunting and poaching, introduction of exotic species, pollution, predator and pest control.

Unit 3: Conservation of Environment: (10hrs)

Concept of sustainability and sustainable development with judicious use of land, water and forestresources; a forestation.

1. Control measures for various types of pollution; use of renewable and alternate sources ofenergy.
2. Solid waste management: Control measures of urban and industrial waste.
3. Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.
4. Environment Laws: Environment Protection Act; Act; Wildlife Protection Act; Forest Conservation Act.
5. International agreements: Montreal and Kyoto protocols; Environmental movements: Bishnois ofRajasthan, Chipko, Silent valley.

UG- LIFE SKILL COURSE

ANALYTICAL SKILLS(AS)

(w.e.f. 2020-2021 A.Y.)

SRI DNR GDC(W) PALAKOL

Semester	Course Code (LS)	Course Title	Hrs/Sem	Hrs/wk	Credits	Sem End Exam (2 Hrs)
III	Life skill course	Analytical skills(AS)	30	2	2	50 Marks

Course Objective: Intended to inculcate quantitative analytical skills and reasoning as an inherentability in students.

Course Outcomes:

After successful completion of this course, the student will be able to;

- Understand the basic concepts of arithmetic ability, quantitative ability, logical reasoning,business computations and data interpretation and obtain the associated skills.
- Acquire competency in the use of verbal reasoning.
- Apply the skills and competencies acquired in the related areas
- Solve problems pertaining to quantitative ability, logical reasoning and verbal abilityinside and outside the campus.

UNIT – 1: (10 Hrs)

Arithmetic ability: Algebraic operations BODMAS, Fractions, Divisibility rules, LCM& GCD(HCF).

Verbal Reasoning: Number Series, Coding & Decoding, Blood relationship, Clocks, Calendars.

UNIT – 2: (10 Hrs)

Quantitative aptitude: Averages, Ratio and proportion, Problems on ages, Time-distance–speed.

Business computations: Percentages, Profit & loss, Partnership, simple compound interest.

UNIT – 3: (07 Hrs)

Data Interpretation: Tabulation, Bar Graphs, Pie Charts, line Graphs. Venn diagrams.

SRI DNR GDC(W) PALAKOL

AGRICULTURAL MARKETING

(w.e.f. 2020-2021 A.Y.)

Semester	Course Code (SD)	Group 'A'	Course Title	Hrs/ Sem	Hrs/wk	Credits	Sem End Exam (2 Hrs)
II	Skill Development Course		Agricultural Marketing	30	2	2	50 Marks

Learning Outcomes:

By the successful completion of this course, the student will be able to;

- Know the kinds of agricultural products and their movement
- Understand the types, structure and functioning of agricultural marketing system
- Comprehend related skills and apply them in sample situations
- Extend this knowledge and skills to their production/consumption environment

Unit- I: **(06hrs)**

Introduction of Agriculture and agricultural products (including agriculture, horticulture, sericulture, floriculture, aquaculture- genetic culture and dairy product) - Agricultural Marketing - Role of marketing - Concepts - Goods and services - Movement of product from farm to consumer –Middlemen
– Moneylenders - Types of agricultural markets (basic classification).

Unit- II: **(09hrs)**

Basic structure and facilities of an agricultural market – Primary, secondary and tertiary markets– Functioning of Market Yards–Market information – Rythu Bharosa Kendras (RBK) – Govt market policies and regulations- Contract farming -Govt Apps for marketing of agri products.

Unit- III: **(10hrs)**

Planning production – assembling – grading - transportation– storage facilities. Price fixation. Dissemination of market information –and role of ICT. Marketing - Mix- Product element- Place element- Price element- Promotion element. Selection of target market. Government programs in support of Agricultural marketing in India.

SRI DNR GDC(W) PALAKOL

UG- SKILL DEVELOPMENT COURSE

ADVERTISING

(w.e.f. 2020-2021 A.Y.)

Semester	Course Code (SD)	Group 'B'	Course Title	Hrs/Sem	Hrs/wk	Credits	Sem End Exam (2 Hrs)
II	Skill Development Course		Advertising	30	2	2	50 Marks

Learning Outcomes:

After Successful completion of this course, the students are able to;

- Understand the field of Advertising
- Comprehend opportunities and challenges in Advertising sector
- Prepare a primary advertising model
- Understand applying of related skills
- Examine the scope for making advertising a future career

UNIT I: **(06hrs)**

Introduction of advertising concepts- functions - Types of advertising - Creative advertising messages - Factors determining opportunities of a product/service/Idea

UNIT II: **(10 hrs)**

Role of advertising agencies and their responsibilities - scope of their work and functions - - Ethical issues - Identifying target groups -Laws in advertising. Advertising Statutory Bodies in India - Role of AAAI (Advertising Agencies Association of India), ASCI (Advertising Standard Council of India)

UNIT III: **(10hrs)**

Types of advertising – Basic characteristics of a typical advertisement –Reaching target groups - Local advertising – Feedback on impact of advertisement - Business promotion.

SRI DNR GDC(W) PALAKOL

UG PROGRAMME (4 Years Honors)
CBCS - 2020-21

(With History, Economics and Political Science Disciplines)

DETAILS OF COURSE TITLES & CREDITS

B.A
HISTORY

Sem	Course no.	Course Name	Course type (T/L/P)	Hrs./ Week (Arts/ Commeerce: 5)	Credits (Arts/ Commeerce: 4)	Max. Marks Cont/ Internal /Mid Assessment	Max.Marks Sem-end Exam
I	1	Ancient Indian History & Culture (From Indus Valley Civil. to 13 Century A.D)	T	5	4	25	75
II	2	Medieval Indian History & Culture (1206 A.D To 1764 A.D)	T	5	4	25	75
III	3	Modern Indian History & Culture (1764-1947 A. D)	T	5	4	25	75

IV	4	History & Culture of Andhra (from 1512 to 1956 AD)	T	5	4	25	75
	5	History Of Modern World (From 15th Cent. AD to 1945 AD)	T	5	4	25	75
V							

Note: *Course type code: T: Theory, L: Lab, P: Problem solving

B.A	Semester: I	Credits: 4
Course: 1	Ancient Indian History & Culture (From Indus Valley Civil. to 13 Century A.D)	Hrs/Wk: 5

Learning Outcomes:

After successful completion of this course, the student will be able to:

- Identify and define various kindsof sources and understand how historybooks are shaped
- Compare and contrast various stages of progress from IVC to Vedic age and analyze the Jain, Buddhist and Vedic faiths
- Increase the awareness and appreciation of Transition from Territorial States to Emergence of Empires
- Analyze the emergence of the Mauryan and Gupta empires during the "classical age" in India
- Evaluate the key facets of ancient society, polity and culture in South India—the feudalism, and the rise of technology and commerce.
- Critically examine the nature of monarchic rule and develop an comprehensive understandingof cultural evolution during ancient period
- Visualize where places are in relation to one another through map pointing

UNIT -I :

Ancient Indian Civilization (from Circa 3000 BC to 6th BC): Indus Valley Civilization - Salient Features;Vedic Age - Society, Polity, Economy, Culture during early and later Vedic period.

UNIT II:

Ancient Indian History & Culture (6th Century BC to 2rd Century AD): Doctrines and Impact of

Jainism and Buddhism; Mauryan Administration, Society, Economy & Culture - Ashoka's Dhamma; Kanishka's Contribution to Indian Culture.

UNIT-III:
History & Culture of South India (2nd Century BC to 8th Century AD): Sangam Literature; Administration, Society, Economy and Culture under Satavahanas; Cultural contribution of Pallavas.

UNIT-IV:
India from 3rd century AD to 8th century AD: Administration, Society, Economy, Religion, Art, Literature and Science & Technology under Guptas – Samudragupta; Cultural contribution of Harsha:Arab Conquest of Sind and its Impact.

UNIT -V:
History and Culture of South India (9th century AD to 13th century AD): Local Self Government of Cholas; Administration, Society, Economy and Culture under Kakatiyas – Rudram Dev

B.A	Semester: II	Credits: 4
Course: 2	Medieval Indian History & Culture (1206 A.D To 1764 A.D)	Hrs/Wk: 5

Learning Outcomes:

After successful completion of this course, the student will be able to:

- Understand the socio, economic and cultural conditions of medieval India
- Describe the advent of Islam in India and study the traces of political and cultural expansion of Turks & Afghans
- Explain the Administration and art and architecture of Vijayanagar Rulers, Mughals and also analyse the rise of the Marathas and the contribution of Shivaji
- Evaluate the establishment of the British rule in India and understand the dangerous consequences disunity at all levels
- Analyze the emergence of composite culture in Indian
- Visualize where places are in relation to one another through map pointing

UNIT-I:
Impact of Turkish Invasions – Balban, AllauddhinKhilji, Md. Bin Tughlaq - Administration, Society, Economy, Religion and Cultural developments under Delhi Sultanate (from 1206 to 1526 AD).

UNIT-II:
Impact of Islam on Indian Society and Culture – Bhakti Movement; Administration, Society, Economy, Religion and Cultural developments under Vijayanagara Rulers.

UNIT-III:
Emergence of Mughal Empire – Babur – Sur Interregnum - Expansion & Consolidation of Mughal Empire – Akbar, Jahangir,Shah Jahan, Aurangazeb.

UNIT-IV:
Administration, Economy, Society and Cultural Developments under the Mughals – Disintegration of Mughal Empire - Rise of Marathas under Shivaji.

UNIT-V:
India under Colonial Hegemony : Beginning of European Settlements - Anglo-French Struggle – Conquest of Bengal by EIC.

B.A	Semester: III	Credits: 4
Course: 3	Modern Indian History & Culture (1764-1947 A. D)	Hrs/Wk: 5

Learning Outcomes:
After successful completion of this course, the student will be able to:

- Unearth the true nature of the British rule and its disastrous impact on Indian economy and society

- Gauge the disillusionment of people against the Company's rule even during the early 19thcentury
- Assess the causes and effects of Reformation movements and also inspire the public to overthrowinequalities of the present day society
- Rise above petty parochial issues after understanding the sacrificial saga of freedom struggle
- Evaluate the undercurrent of communal politics that led to India's partition and identify theenemies of India's integrity and sovereignty
- Visualize where places are in relation to one another through map pointing

UNIT I:
Policies of Expansion –Warren Hastings, Cornwallis - Subsidiary Alliance & Doctrine of Lapse – Causes& Results of 1857 Revolt – Lytton, Rippon, Curzon

UNIT II:
Social, Religious & Self-Respect Movements – Raja Rammohan Roy, DayanandaSaraswathi, SwamiVivekananda, JyotibaPhule, Narayana Guru, Periyar, Dr. B. R. Ambedkar

UNIT III:
Causes for the growth of Nationalism - Freedom Struggle from 1885 to 1920 , Moderate Phase —Militant Phase: Vandemataram Movement - Home Rule Movement

UNIT IV:
Freedom Struggle from 1920 to 1947: Gandhiji's Role in the National Movement – RevolutionaryMovement – Subhas Chandra Bose

UNIT V:
Muslim League & the Growth of Communalism – Partition of India – Advent of Freedom - Integrationof Princely States into Indian Union – Sardar Vallabhai Patel

B.A	Semester: IV	Credits: 4

SRI DNR GDC(W) PALAKOL

Course: 4	History & Culture of Andhra (from 1512 to 1956 AD)	Hrs/Wk: 5

Learning Outcomes:

After successful completion of this course, the student will be able to:

- Interpret social and culture transformation from medieval to modern Andhra
- Relate key historical development during medieval period occurring in costal Andhra and Telangana regions and analyze socio-political and economic changes under Qutbshahirules
- Understand gradual change, or change in certain aspects of society in Andhra, rather than rapid orfundamental changes.
- Explain how the English East India company became the most dominant power and outline theimpact of colonial on different aspects inAndhra.
- Outline the issues related to caste, women, widow remarriage , child marriage, social reforms andthe laws and policies of colonial administration towards these issues.
- Take pride in the non-violence struggle for Indian Independence and relate the important of peace
  in every life.
- Apply the knowledge of the regional history to understand the regional, linguistic and othercultural aspirations of the present day society
- Visualize where places are in relation to one another through map pointing

UNIT I:

Andhra through 16th & 19th Centuries AD: Evolution of Composite culture- the Quatbshahi of Golkonda

- Administration, Society &Economy - Literature & architecture: Advent of European and settlements in Andhra - Occupation of Northren Cricars and Ceeded Districts - Early revolts again the British.

UNIT II:

Andhra Under British ruel: Administration - Land revenue settlements -Society - Education - Religion - Impact of Industrial revolution on economy- peasantry &famines - contribution of sir thomas munroe &
C.P. Brown - impact of 1857 revolts in Andhra.

UNIT III:

Social Reforms &New literary Movements : Kandukuri Vereeshalingam, Ragupathi Venkatarathnam Naidu, Guruzada AppaRao,Kommarraju Venkata Laxman Rao ; New literacy movements :Rayaprolu SubbaRao, Viswanath Satyanarayana, Gurram Jashua , Boyi Bhimanna, Sri Sri.

UNIT IV:

Freedom Movement in Andhra (1885-1947): Vandemataram Movement– Home Rule Movement in Andhra - Non-Cooperation Movement - AlluriSeetarama Raju &Rampa Revolt (1922-24) - Civil Disobedience Movement – Quit India Movement.

UNIT V:

Movement for separate Andhra State (1953) and AP (1956): Causes – Andhra Maha Sabha –Conflict between Coastal Andhra &Rayalaseema – Sri Bagh Pact – work of various Committees – Martyrdom of PottiSriramulu – Formation of separate Andhra State (1953); Movement for formation of Andhra Pradesh(1956): VisalandhraMahasabha – Role of Communists – States Reorganization Committee – Gentlemen'sAgreement – Formation of Andhra Pradesh

B.A	Semester: IV	Credits: 4
Course: 5	History Of Modern World (From 15th Cent. AD to 1945 AD)	Hrs/Wk: 5

Learning Outcomes:

After successful completion of this course, the student will be able to:

- Demonstrate advanced factual knowledge of world histories, politics, and cultures
- Assess and appraise the developments in art, literature, and society during the Renaissance and utilize content knowledge of the Reformation and Counter Reformation to make predictions about the evolution of Christianity in Europe and abroad.
- Evaluate the causes for the Glorious Revolution and American Revolution and identify the background for the evolution of human rights movement.
- Understand the main events of the French Revolution and its significance in the shift in European culture from Enlightenment to Romanticis.
- Think how Russia's traditional monarchy was replaced with the world's first Communist state.
- Know how the world wars affected people all over the world and the destruction they caused.
- Develop the intellectual curiosity and habits of thought that will lead to life-long learning and continued engagement with European history, literature, culture, languages, and current affairs and acquire advanced international and intercultural competency through coursework in international studies.
- Visualize where places are in relation to one another through map pointing.

UNIT I:

Transformation from Medieval to Modern Era – Chief Characteristics; Glorious Revolution (1688) Originof Parliament Bill of Rights – Results

UNIT II:

American Revolution (1776); French Revolution (1789) – Causes, Course and Results

UNIT III:

Unification of Italy; Unification of Germany

UNIT IV:

Communist Revolution in Russia; World War I: Causes – Results of the War – Paris Peace Conference;League of Nations

UNIT V:

World War II: Causes, Fascism & Nazism – Results; The United Nations Organization: Structure,Functions and Challenges.

SRI DNR GDC(W) PALAKOL

UG PROGRAM (4 Years

Honors)CBCS-2020-21

B.Sc/B.A
ECONOMICS

DETAILS OF COURSE TITLES & CREDITS

Sem	Course no.	Course Name	Course type **(T/L/P)**	Hrs/Week **(Arts:5)**	Credits **(Arts:4)**	Max. Marks **Cont/ Internal /Mid -Assessment**	Max. Marks **Sem- end Exam**
I	1	Microeconomic Analysis	T	5	4	25	75
II	2	Macroeconomic Analysis	T	5	4	25	75
III	3	Development Economics	T	5	4	25	75
IV	4	Economic Development in India and Andhra Pradesh	T	5	4	25	75
	5	Statistical Methods for Economics	T	5	4	25	75

Note: *Course type code: T: Theory, L: Lab, P: Problemsolving

SRI DNR GDC(W) PALAKOL

B.Sc/B.A.	Semester – I	Credits: 4
Course:1	Microeconomic Analysis	Hrs/Wk: 5

Learning Outcomes For The Course

At the end of the course, the student is expected to demonstrate the following cognitive abilities and psychomotor skills.

1. Remembers and states in a systematic way(Knowledge)
   a) the differences between microeconomic analysis and macro economic analysis
   b) various laws and principles of microeconomic theory under consumption,
2. Explains(understanding)
   a) Various terms and concepts relating to microeconomic analysis with the help of examples of real life.

a. Consumer's equilibrium and consumer's surplus using indifference curve analysis.

b. various laws and principles of consumption, production, and income distribution

c. determination of price and output discriminating different market conditions in short term and long term.

3. Critically examines using data and figures (analysis and evaluation)

a. various laws and principles of microeconomic analysis and market conditions

b. Application of the concept of demand elasticity and its relation with Average and Marginal Revenue.

c. the relationship between average and marginal cost/revenue both in long term and

4. Draws critical diagrams and graphs to explain and examine the application of various laws and principles of micro economic analysis.

UNIT I:

Economic Analysis and Methodology: Meaning and Definitions of Economics- Scarcity and Choice as fundamental problems of economics - Scope and Importance of Micro economic analysis - Micro and Macro economic Analysis –Inductive and Deductive methods – partial and general equilibrium - Principlesof Micro economics.

UNIT II:

Theory of Consumption: Concept of Demand -Factors determining demand - Law of Demand - reasons and exceptions - Elasticity of Demand –Cardinal utility; Diminishing Marginal Utility and Equi Marginal Utility - Ordinal utility: Indifference Curve analysis: Properties of Indifference curves, Indifference Curve Map -Marginal Rate of Substitution - Budget Line - Changes -Consumer Equilibrium under Indifference Curve Analysis – Consumers' Surplus.

UNIT III:

Theory of Production: Concept and Objectives of Firm - Production Function: Cobb- Douglas Production Function-Law of Variable Proportions -Laws of Returns to Scale - Economies of large scale - Concepts of Cost - Total, Average and Marginal Costs - Law of Supply - Concept of Revenue : Total, Average and Marginal Revenues - Relation between Average and Marginal Revenues and elasticity of Supply.

UNIT IV:

Theory of Exchange: Concepts of Market: Criteria for Classification of Markets - Perfect Competition– Conditions, Price and Output determinations; Monopoly : Conditions, Price and Output Determination - Price Discrimination; Monopolistic Competition - Assumptions - Price and output determination - Selling Costs ; Oligopoly -Types- Kinky demand curve and Price rigidity

UNIT V:

Theory of Distribution: The concepts of Functional and Personal Distribution of Income - Marginal Productivity Theory of Distribution - Modern Theory of Distribution -Concept of Rent - Ricordian Theory of Rent – Marshall's concepts of Economic Rent and Quasi Rent; Theories of Wage Determination: Subsistence Theory and Standard of Living Theory - Modern Theory of Wages; Classical Theory of Interest -Liquidity Preference Theory of Interest; Theories of Profit: Risk and Uncertainty, Dynamic and Innovations Theories.

B.Sc/B.A.	Semester – II	Credits: 4
Course:2	Macro Economic Analysis	Hrs/Wk: 5

Learning Outcomes For The Course

At the end of the course, the student is expected to demonstrate the following cognitive abilities and psychomotor skills.

1. Remembers and states in a systematic way(knowledge):
   Various concepts, definitions, laws and principles of macroeconomic theory with reference to income, employment, money, banking and finance
2. Explains(understanding):
   a) The difference between various concepts and components of national income with illustrations and methods of measuring national income
   b) various terms, concepts, laws and principles, theories relating to income, employment, consumption, investment, money, price-level and phases of trade cycles
   c) functions of commercial banks and central bank, creation and control of credit
3. Critically examines using data and figures (analysis and evaluation)
   a) in order to understand the interrelationship between various components of national income.
   b) the theories of macroeconomics with reference to their assumptions ,implications and applicability.
   c) Empirical evidences of Consumption and Investment Functions and factors influencing them
4. Draws critical formulae, diagrams and graphs.
   a. consumption and investment functions; concepts of multiplier and accelerator
   b. price indices, inflation and trade cycles

UNIT I:

National Income: Macroeconomics - Definition, Scope and Importance - Difference between Micro economic and Macro economic Analyses – Circular Flow of Income -National Income: Definitions, Concepts, Measurement of National Income - Difficulties - Importance - Concept of Green Accounting

UNIT II:

Theory of Employment: Classical Theory of Employment - Say's Law of Markets - Criticism - Keynesian Theory of Employment - Consumption Function - Keynes' Psychological Law of Consumption - Average and Marginal Propensity to Consume - Factors determining Consumption Function- Investment Function: Marginal Efficiency of Capital -Multiplier and Accelerator -

Keynesian Theory of Employment.

UNIT III:

Money and Banking: Definitions of Money - Concepts of Money, Liquidity and Finance - Gresham's Law - RBI classification of Money - Theories of Money: Fisher and Cambridge (Marshall, Pigou, Robertson and Keynes equations) - Banking - Definition and types of Banking - Commercial Banks - Functions -Recent Trends in Banking - Mergers and Acquisitions - Central Bank - Functions - Control of Credit by Central Bank - NBFCs- Factors contributing to their Growth and their Role.

UNIT IV:

Inflation and Trade Cycles: Inflation: Concepts of Inflation, deflation and stagflation - Phillip's Curve - Measurement of Inflation - CPI and WPI -Types of Inflation - Causes and Consequences of Inflation -Measures to Control Inflation. Trade Cycles: Phases of Trade Cycle -Causes and Measures to control Trade Cycles.

UNIT V:

Finance and Insurance: Financial Assets and Financial Instruments - Financial Markets - Functions of Money Market - Functions of Capital Market - Stock Market - Exchanges – Index : Sensex and Nifty Concept of Insurance -Types and Importance of Insurance.

B.Sc/B.A.	Semester – III	Credits: 4
Course:3	Development Economics	Hrs/Wk: 5

Learning Outcomes For The Course

At the end of the course, the student is expected to demonstrate the following cognitive abilities and psychomotor skills.

1. Remembers and states in a systematic way(Knowledge):
   Various concepts and definitions and indicators relating to economic growth and Development including recent developments
2. Explains(understanding):
   a) Distinction between growth and development with examples
   b) Characteristics of developing and developing economies and distinction between the two
   c) factors contributing to development, Choice of Techniques and a few important models and strategies of growth
3. Critically examines using data and figures (analysis and evaluation)
   a. the theoretical aspects of a few models and strategies of economic growth
   b. role and importance of various financial and other institutions in the context of India's economic development
4. Draws critical diagrams and graphs.
   a. to explain the models and strategies
   b. to highlight empirical evidences to support the strategies

UNIT I:

Economic Growth and Development: Economic Development as a Branch of Study of Economics – Scope and Importance - Distinction between Economic Growth and Economic Development -Measures of Economic Development and their limitations - Relevance of Herd (Group) Immunity in the context of COVID 19 - three core values of economic development :

Sustainability, Self-esteem and Freedom – Economy and Environmen : Concepts of sustainable development and inclusive growth**.**

UNIT II:

Modern Economic Growth: Characteristics of Underdeveloped Countries - World Bank and IMF Classification of countries - Modern economic growth – Kuznets' Six Characteristics - Obstacles to economic development - Vicious Circle of Poverty and cumulative causation - Factors of economic growth: Economic and Non-economic - Capital Formation – Foreign and Domestic capital, Debt and Disinvestment.

UNIT III:

Theories of Development and Underdevelopment: Classical Theory: Adam Smith, Ricardo and Malthus -Marxian Theory - Schumpeter Theory -Rostow's Stages of Economic Growth - Harrod- Domar two sector model -Solow's Model and Robinson's Golden Age.

UNIT IV:

Strategies of Economic Development: Strategies of Economic Development – Big Push - Balanced Growth -Unbalanced Growth - Mahalanobis Model - Agriculture vs Industry -Capital Intensive Technology vs Labour Intensive Technology -Role of Infrastructure in Economic Development.

UNIT V:

Institutions and Economic Development: Role of State in Economic Development -Role of Markets - Market Failure and Regulation by State -Public sector vs Private sector -Economic Planning – concept, objectives and types -NITI Ayog - Economic Federalism -Financial Institutions and Economic Development -Role of International Institutions-IDBI, ADB, IMF - Foreign Trade - FIIs and FDIs.

B.Sc/B.A.	Semester – IV	Credits: 4
Course:4	Economic Development- India And Andhra Pradesh	Hrs/Wk: 5

Learning Outcomes For The Course

At the end of the course, the student is expected to demonstrate the following cognitive abilities and psychomotor skills.

1. Remembers and states in a systematic way(Knowledge)
   a. leading issues of Indian economic development with reference to potential for growth, obstacles and policy responses
   b. Objectives, outlays and achievements of economic plans and growth strategies
2. Explains(understanding)
   a. Available Resources, demographic issues, general problems of poverty and unemployment and relevant policies
   b.Sector specific problems, remedial policies and their effectiveness relating to Agriculture and Industrial Sectors of Indian and AP economy and infrastructure issues of AP economy
   c. Indian Tax system, recent changes, issues of public expenditure and public debt, recent finance commissions and devolution of funds
   d. Major issues of economic development of Andhra Pradesh after bifurcation and Central assistance
3. Critically examines using data and figures (analysis and evaluation)
   a. Leading issues of current importance relating to India and AP economy, major

policies and programmes

b. Covid– 19 and its impact on Indian economy

4. Uses official statistical data and reports including tables and graphs

a. To explain the achievements of Indian economy with reference to the objectives of planning and policy and make critical evaluation.

UNIT I:

Basic Features: Basic characteristics of Indian Economy as a developing economy – Economic development since independence - Objectives and achievements of planning – Planning Commission/NITI Ayog and their approaches to economic development - India's Rank in Global Human Development Index .

UNIT II:

National Income and Demography: Trends in National income - Demographic trends - Poverty and Inequalities – Occupational Structure and Unemployment - Various Schemes of employment generation and eradication of poverty – Issues in Rural Development and Urban Development –Intra-state and Inter-state Labour Migration and unorganized sector Problems of Migrant Labour

UNIT III:

Agricultural and Industrial Developments: Indian Agriculture – Agricultural Strategy and Agricultural Policy – Agrarian Crisis and land reforms – Agricultural credit – Minimum Support Prices -Malnutrition and Food Security - Indian Industry - Recent Industrial Policy – Make-in India – Start-up and Stand-up programmes – SEZs and Industrial Corridors - Economic Reforms and their impact - Economic initiatives by government of India during COVID - Atmanirbhar Bharat package.

UNIT IV:

Indian Public Finance: Fiscal policy- Indian Tax System and Recent changes – GST and its impact on Commerce and Industry – Centre, States financial relations- Recommendations of Recent Finance Commission – Public Expenditure and Public Debt –Concepts of Budget.

UNIT V:

Andhra Pradesh Economy: The basic characteristics of Andhra Pradesh economy after bifurcation in 2014 – Impact of bifurcation on the endowment of natural resources and state revenue – new challenges to industry and commerce - the new initiatives to develop infrastructure – Power and Transport –Health and Education- Information Technology and e-governance – Urbanization and smart cities – Skill development and employment –Recent Social welfare programmes.

B.Sc/B.A.	Semester – IV	Credits: 4
Course:5	**Statistical Methods for Economics**	Hrs/Wk: 5

Learning Outcomes For The Course

At the end of the course, the student is expected to demonstrate the following cognitive abilities and psychomotor skills.

1. Remembers and states in a systematic way(Knowledge)

a. the definitions, terms and their meaning relating to statistical methods

b. various formulae used to measure central tendency, correlation regression and Indices

2. Explains(understanding)
   a. Importance of statistics and its applications
   b. The method of classification of primary data
   c. Uses of Correlation and Regression analysis, time series and index numbers in economic analysis
3. Analyses and solves using given data and information (analysis and evaluation)
   a. different kinds of statistical problems using various principles and formulae relating to central tendency, correlation, regression, time series and indices
   b. to interpret data and suggest solutions to economic problems
4. Draws critical diagrams and graphs.
   a. Histogram, Frequency Polygon and Frequency Curve
   b. More than cumulative and less than cumulative frequency curves (Ogive)
   c. Different types of Bar diagrams
   d. Pie Diagram and its uses in economic analysis

UNIT I:

Nature and Definition of Statistics: Introduction to Statistics – Definition, scope, importance and limitations of Statistics – Primary and Secondary data- Census and Sampling techniques and their merits and demerits.

UNIT III:

Diagrammatic Analysis: Collection of data - Schedule and questionnaire – Frequency distribution – Tabulation – diagram and graphic presentation of data – Histogram, Frequency Polygon, Cumulative Frequency Curves - Bar Diagrams and Pie Diagram.

UNIT IV:

Measures of Central Tendency and Dispersion: Measures of Central Tendency and Dispersion - Types of averages- Arithmetic Mean, Geometric Mean, Harmonic Mean – Median – Mode – Dispersion - Range, Quartile Deviation, Mean Deviation, Standard Deviation- Coefficient of Variation.
Correlation and Regression: Correlation and Regression - Meaning, Definition and uses of Correlation- Types of Correlation- Karl Pearson's Correlation coefficient - Spearman's Rank Correlation- Regression Equations - utility of regression analysis – Demand forecasting.

UNIT V:

Time Series and Index Numbers: Time Series and Index Numbers: Definition and components of Time Series – Measurement of Time Series – Moving Average and the Least Squares Method – Index Numbers - Concepts of Price and Quantity Relatives – Laspeyer's, Paasche's and Fisher's Ideal Index Numbers – Uses and Limitations of IndexNumbers.

SRI DNR GDC(W) PALAKOL

B.A

POLITICAL SCIENCE

DETAILS OF COURSE TITLES & CREDITS

Sem	Courses No	Name of Course	Course Type (T/L/P)	Hours/Week (Arts:5)	Credits (Arts:4)	Max. Marks Cont/ Internal /Mid - Assessment	Max. Marks Sem- end Exam
I	1	Introduction to Political Science	**T**	**5**	**4**	**25**	**75**
II	2	Basic Organs of the Government	**T**	**5**	**4**	**25**	**75**
III	3	Indian Government and Politics	**T**	**5**	**4**	**25**	**75**
IV	4	Indian Political Process	**T**	**5**	**4**	**25**	**75**
	5	Western Political Thought	**T**	**5**	**4**	**25**	**75**
Total				**25**	**20**	**125**	**375**

Note: *Course type code: T: Theory, L: Lab, P: Problemsolving

SRI DNR GDC(W) PALAKOL

B.A	Semester: I	Credits: 4
Course: 1	Introduction To Political Science	Hrs/Wk: 5

Learning Outcomes:

On successful completion of the course the students will be able to;

- Recall the previous knowledge about Political Science and understand the nature and scope, traditional and modern approaches of Political Science.
- Understand concepts intrinsic to the study of Political Science.
- Have solid theoretical understanding of Rights and its theories along with the basicaspects of certain political ideologies.
- Apply the knowledge to observe the field level phenomena

UNIT I:

INTRODUCTION:

1. Definition, Nature, Scope and Importance of Political Science – Relations with allied disciplines (History, Economics, Philosophy and Sociology).
2. Approaches to the study of Political Science: Traditional Approaches-Philosophical, Historical. Modern Approaches-Behavioral and System Approach.

UNIT II:

STATE:

1. Definition of the State, Elements of the State, Theories of Origin of the State-(Divine Origin, Force, Evolutionary and Social Contract).
2. Concepts of Modern State and Welfare State.

UNIT III:

CONCEPTS OF POLITICAL SCIENCE:

1. Law, Liberty, Equality.
2. Power, Authority and Legitimacy.

UNIT IV:

THEORIES OF RIGHTS:

1. Meaning, Nature and Classification of Rights**.**
2. Theories of Rights.

UNIT V:

POLITICAL IDEOLOGIES:

1. Liberalism, Individualism, Anarchism.
2. Socialism, Marxism and Multiculturalism.

SRI DNR GDC(W) PALAKOL

B.A	Semester: II	Credits: 4
Course: 2	Basic Organs Of The Government	Hrs/Wk: 5

Learning Outcomes:

On successful completion of the course the students will be able to:

- Understand the Origin and Evolution of the concept of Constitutionalism andclassification of Constitutions.
- Acquaint themselves with different theories of origin of State.
- Understand and analyses organs and forms of Governments along with a deep insight intothe various agents involved in the political process.
- Apply the knowledge to analyse and evaluate the existing systems

UNIT I:

CONSTITUTION:

1. Meaning, Definition, Origin and Evolution of Constitution.
2. Classification of the Constitutions-Written and Unwritten; Rigid and Flexible.

UNIT II:

ORGANS OF THE GOVERNMENT:

1. Theory of Separation of Powers-B.D.Montesquieu.
2. Legislature-Unicameral and Bicameral-Power and Functions, Executive-Types,Powers and Functions. Judiciary-Powers and Functions.

UNIT III:

FORMS OF GOVERNMENT:

1. Unitary and Federal forms of Governments-Merits and Demerits.
2. Parliamentary and Presidential forms of Governments- Merits and Demerits.

UNIT IV:

DEMOCRACY:

1. Meaning, Definition, Significance, Theories and Principles of Democracy.
2. Types of Democracy: Direct and Indirect Democracy-Methods, Merits and Demerits-Essential Conditions for Success of Democracy.

UNIT V:

POLITICAL PARTIES, PRESSURE GROUPS AND PUBLIC OPINION:

1. Meaning, Definition and Classification of Political Parties: National and Regional-Functions of Political Parties.
2. Pressure Groups (Interest Groups)- Meaning, Definition, Types, Functions and Significance of Public Opinion.

SRI DNR GDC(W) PALAKOL

B.A	Semester: III	Credits: 4
Course: 3	Indian Government And Politics	Hrs/Wk: 5

Learning Outcomes:

On successful completion of the course the students will be able to:

- Acquire knowledge about the historical background of Constitutional development in India, appreciate philosophical foundations and salient features of the Indian Constitution.
- Analyze the relationship between State and individual interms of Fundamental Rights and Directive Principles of State Policy.
- Understand the composition of and functioning of Union Government as well as State Government and finally
- Acquaint themselves with the judicial system of the country and its emerging trends such as judicial reforms.

UNIT I:

SOCIAL AND IDEOLOGICAL BASE OF THE INDIAN CONSTITUTION:

1. Constitutional Development in India during British Rule-A Historical Perspective with reference to Government of India Acts, 1909,1919and 1935.
2. Constituent Assembly-Nature, Composition, Socio-Economic, Philosophical Dimensions and Salient Features of the Indian Constitution.

UNIT II:

INDIVIDUAL AND STATE:

1. Fundamental Rights, Directive Principles of State Policy and Fundamental Duties-Differences between Fundamental Rights and Directive Principles of State Policy.
2. The 'Doctrine of Basic Structure of the Constitution' with reference to Judicial Interpretations and Socio-Political Realities.

UNIT III:

UNION EXECUTIVE:

1. President of India-Mode of Election, Powers and Functions.
2. Parliament-Composition, Powers and Functions, Legislative Committees, Prime Minister and Council of Ministers-Powers andFunctions, Role in Coalition Politics

UNIT IV:

STATE EXECUTIVE:

1. Governor-Mode of Appointment, Powers and Functions.
2. Legislature-Composition, Powers and Functions, Chief Minister and Council of Ministers-Powers and Functions

UNIT V:

THE INDIAN JUDICIARY:

1. Supreme Court-Composition and Appointments, Powers and Functions or Jurisdiction of the Supreme Court, Judicial Review, Judicial Activism.
2. High Court-Composition, Powers and Functions, Debates on the mode of appointment of Judges-National Judicial AppointmentsCommission and Judicial Reforms.

SRI DNR GDC(W) PALAKOL

B.A	Semester: IV	Credits: 4
Course: 4	INDIAN POLITICAL PROCESS	Hrs/Wk: 5

Learning Outcomes:

On successful completion of the course the students will be able to :

- Know and understand the federal system of the country and some of the vital contemporary emerging issues.
- Evaluate the electoral system of the country and to identify the areas of electoral reforms.
- Know the constitutional base and functioning of local governments with special emphasison 73rd& 74th Constitutional Amendment Acts.
- Understand the dynamics of Indian politics, challenges faced and gain a sensitive comprehension to the contributing factors.
- Apply the knowledge and critically comprehend the functioning of some of the regulatoryand governance institutions.
- Propose theoretical outline alternate models.

UNIT I:

FEDERAL PROCESSES:

1. Features of Indian Federal System- Centre-State Relations-Legislative, Administrative and Financial.
2. Emerging Trends in Centre-State Relations-Restructuring Centre- State Relations-Recommendations of Sarkaria Commission, M.M.Punchi Commission.

UNIT II:

ELECTORAL PROCESSES:

1. The Election Commission of India, Powers and Functions.
2. Issues of Electoral Reforms, Voting Behaviour-Determinants and Problems of Defections.

UNIT III:

GROSSROOT DEMOCRACY-DECENTRALISATION:

1. Panchayat Raj system-Local and Urban Governments-Structure, Powers and Functions.
2. Democratic Decentralization-Rural Development and Povertyalleviation with reference to 73rd and 74th Constitutional Amendment Acts, Challenges and Prospects.

UNIT IV:

SOCIAL DYNAMICS AND EMERGING CHALLENGES TO INDIAN POLITICAL SYSTEM:

1. Role of Caste, Religion, Language and Regionalism in India.
2. Politics of Reservation, Criminalization of Politics and Internal threats to Security.

UNIT V:

REGULATORY AND GOVERNANCE INSTITUTIONS:

1. NITI Ayog, Finance Commission, Comptroller and Auditor General of India.
2. Central Vigilance Commission, Central Information Commission, Lokpal and Lokayukta.

SRI DNR GDC(W) PALAKOL

B.A	Semester: IV	Credits: 4
Course: 5	WESTERN POLITICAL THOUGHT	Hrs/Wk: 5

Learning Outcomes:

On successful completion of the course the students will be able to:

- Understand the fundamental contours classical, western political philosophy, basicfeatures of medieval political thought and shift from medieval to modern era.
- Understand the Social Contract Theory and appreciate its implications on the perceptionof State in terms of its purposes and role.
- Acquaint with the Liberal and Marxist philosophy and analyze some trends in Western Political Thought.
- Critically analyse the evolution of western politicalthought.

UNIT I:

ANCIENT GREEK POLITICAL THOUGHT:

1. Plato-Rule of Philosopher Kings-Theory of Justice-Ideal State and Education
2. Aristotle-Theory of State-Classification of Governments-Citizenship, Slavery and Theory of Revolutions.

UNIT II:

MEDIEVAL AND MODERN POLITICAL THOUGHT:

1. St.Augustine-Theory of Two Cities.
2. Niccolo Machiavelli-State and Statecraft.

UN IT III:

CONTRACTUAL POLITICAL THOUGHT:

1. Thomas Hobbes- Social Contract and Absolute Sovereignty.
2. John Locke- Human Nature, State of Nature, Social Contract, Natural Rights and Limited Government.
3. Jean Jacques Rousseau- Human Nature, State of Nature, Social Contract, General Will and Popular Sovereignty

UNIT IV:

UTILITARIAN POLITICAL THOUGHT:

1. Jermy Bentham-Theory of Utility, Law and Reforms.
2. J.S.Mill-Theory of Liberty and Representative Government.

UNIT V:

MARXIST POLITICAL THOUGHT:

1. Karl Marx-Dialectical Materialism, Theory of Surplus Value and Class Struggle.
2. Antonio Gramsci-Hegemony and Civil Society.

SRI DNR GDC(W) PALAKOL

B. Com
GENERAL

DETAILS OF COURSES TITLES AND CREDITS

Sem	Course No	Course Name	Course Type (T/P/L)	Hrs/Week	Credits	Max. Marks	Max. Marks
				Commerce:5	Commerce:4	Count/Internal/ Mid Assessment	Sem- End Exam
I	1A	Fundamentals of Accounting	T	5	4	25	75
	1B	Business Organization and Management	T	5	4	25	75
	1C	Business Environment	T	5	4	25	75
II	2A	Financial Accounting	T	5	4	25	75
	2B	Business Economics	T	5	4	25	75
	2C	Banking Theory & Practice	T	5	4	25	75
III	3A	Advanced Accounting	T	5	4	25	75
	3B	Business Statistics	T	5	4	25	75
	3C	Marketing	T	5	4	25	75
IV	4A	Corporate Accounting	T	5	4	25	75
	4B	Cost and Management Accounting	T	5	4	25	75
	4C	Income Tax	T	5	4	25	75
	4D	Business Laws	T	5	4	25	75
	4E	Auditing	T	5	4	25	75
	4F	Goods and Service Tax	T	5	4	25	75

SRI DNR GDC(W) PALAKOL

B.Com	Semester: I	Credits: 4
Course: 1A	FUNDAMENTALS OF ACCOUNTING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to

- Identify transactions and events that need to be recorded in the books of accounts.
- Equip with the knowledge of accounting process and preparation of final accounts of sole trader.
- Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP.
- Analyze the difference between cash book and pass book in terms of balance and make reconciliation.
- Critically examine the balance sheets of a sole trader for different accounting periods.
- Design new accounting formulas & principles for business organisations.

UNIT I:

Introduction : Need for Accounting – Definition – Objectives, – Accounting Concepts and Conventions – GAAP - Accounting Cycle - Classification of Accounts and its Rules – BookKeeping and Accounting - Double Entry Book-Keeping - Journalizing - Posting to Ledgers, Balancing of Ledger Accounts (including Problems).

UNIT II:

S**ubsidiary Books:** Types of Subsidiary Books - Cash Book, Three-column Cash Book- Petty Cash Book (including Problems).

UNIT III:

Trial Balance and Rectification of Errors: Preparation of Trial balance - Errors – Meaning – Types of Errors – Rectification of Errors – Suspense Account (including Problems)

UNIT IV:

Bank Reconciliation Statement: Need for Bank Reconciliation - Reasons for Difference between Cash Book and Pass Book Balances- Preparation of Bank Reconciliation Statement - Problems on both Favourable and Unfavourable Balance (including Problems).

UNIT V:

Final Accounts: Preparation of Final Accounts: Trading account – Profit and Loss account – Balance Sheet – Final Accounts with Adjustments (including Problems).

SRI DNR GDC(W) PALAKOL

B.Com	Semester: I	Credits: 4
Course: 1B	BUSINESS ORGANIZATION AND MANAGEMENT	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will be able to:

- Understand different forms of business organizations.
- Comprehend the nature of Joint Stock Company and formalities to promote a Company.
- Describe the Social Responsibility of Business towards the society.
- Critically examine the various organizations of the business firms and judge the best among them.
- Design and plan to register a business firm. Prepare different documents to register a company at his own.
- Articulate new models of business organizations.

UNIT I:

Introduction Concepts of Business, Trade, Industry and Commerce: Business – Meaning, Definition, Features and Functions of Business - Trade Classification – Aids to Trade – Industry Classification and Commerce - Factors Influencing the Choice of Suitable form of Organisation.

UNIT II:

Forms of Business Organizations: Features, Merits and Demerits of Sole Proprietor Ship and Partnership Business - Features Merits and Demits of Joint Stock Companies - Public Sector Enterprises (PSEs) - Multinational Corporations (MNCs)- Differences between Private Limited Public Limited Company.

UNIT III:

C**ompany Incorporation:** Preparation of Important Documents for Incorporation of Company - Certificate of Incorporation and Certificate of Commencement of Business - Contents of Memorandum and Articles of Association - Contents of Prospectus.

UNIT IV:

Management: Meaning Characteristics - Fayol's 14 Principles of Management - Administration Vs Management - Levels of Management.

UNIT V:

Functions of Management: Different Functions of Management - Meaning – Definition – Characteristics Merits and Demits of Planning - Principles of Organisation – Line and staff of Organisation.

SRI DNR GDC(W) PALAKOL

B.Com	Semester: I	Credits: 4
Course: 1C	BUSINESS ENVIRONMENT	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the concept of business environment.
- Define Internal and External elements affecting business environment.
- Explain the economic trends and its effect on Government policies.
- Critically examine the recent developments in economic and business policies of the Government.
- Evaluate and judge the best business policies in Indian business environment.
- Develop the new ideas for creating good business environment.

UNIT I:

Overview of Business Environment: Business Environment – Meaning – Characteristics – Scope - Macro and Micro Dimensions of Business Environment - Environmental Analysis.

UNIT II:

Economic Environment: Economic Environment – Nature of the Economy – Structure of Economy – Economic Policies & Planning the Economic Condition – NITI Ayog – National Development Council – Five Year Plans.

UNIT III:

Economic Policies: Economic Reforms and New Economic Policy – New Industrial Policy – Competition Law – Fiscal Policy – Objectives and Limitations – Monetary Policy and RBI

UNIT IV:

Social, Political and Legal Environment: Concept of Social Responsibility of Business towards Stakeholders - Demonetisation, GST and their Impact - Political Stability - Legal Changes.

UNIT V:

Global Environment : Globalization – Meaning – Role of WTO – WTO Functions - IBRD– Trade Blocks, BRICS, SAARC, ASEAN in Globalisation.

B.Com	Semester: II	Credits: 4
Course: 2A	FINANCIAL ACCOUNTING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course the student will able to:

- Understand the concept of consignment and learn the accounting treatment of the various aspects of consignment.
- Analyze the accounting process and preparation of accounts in consignment and joint venture.
- Distinguish Joint Venture and Partnership and to learn the methods of maintaining records under Joint Venture.
- Determine the useful life and value of the depreciable assets and maintenance of Reserves in business entities.
- Design an accounting system for different models of businesses at his own using the principles of existing accounting system.

UNIT I:

Depreciation: Meaning and Causes of Depreciation - Methods of Depreciation: Straight Line – Written Down Value –Annuity and Depletion Method (including Problems).

UNIT II:

Provisions and Reserves: Meaning – Provision vs. Reserve – Preparation of Bad Debts Account – Provision for Bad and Doubtful Debts – Provision for Discount on Debtors– Provision for Discount on Creditors - Repairs and Renewals Reserve A/c (including Problems).

UNIT III:

Bills of Exchange: Meaning of Bill – Features of Bill – Parties in the Bill – Discounting of Bill – Renewal of Bill – Entries in the Books of Drawer and Drawee (including Problems).

UNIT IV:

Consignment Accounts: Consignment - Features - Proforma Invoice - Account Sales – Del-credere Commission - Accounting Treatment in the Books of Consigner and Consignee - Valuation of Closing Stock - Normal and Abnormal Losses (including Problems).

UNIT V:

Joint Venture Accounts: JointVenture - Features - Difference between Joint- Venture and Consignment – Accounting Procedure – Methods of Keeping Records–One Vendor Keeps the Accounts and Separate Set off Books Methods (including Problems).

B.Com	Semester: II	Credits: 4
Course: 2B	BUSINESS ECONOMICS	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Describe the nature of economics in dealing with the issues of scarcity of resources.
- Analyze supply and demand analysis and its impact on consumer behaviour.
- Evaluate the factors, such as production and costs affecting firms behaviour.
- Recognize market failure and the role of government in dealing with those failures.
- Use economic analysis to evaluate controversial issues and policies.
- Apply economic models for managerial problems, identify their relationships, and formulate the decision making tools to be applied for business.

UNIT I:

Introduction: Meaning and Definitions of Business Economics - Nature and Scope of Business Economics - Micro and Macro Economics and their Interface.

UNIT II:

Demand Analysis: Meaning and Definition of Demand – Determinants to Demand –Demand Function -Law of Demand – Demand Curve – Exceptions to Law of Demand - Elasticity of Demand – Measurements of Price Elasticity of Demand.

UNIT III:

Production, **Cost and Revenue Analysis**: Concept of Production Function – Law of Variable Proportion - Law of Returns to Scale - Classification of Costs -Break Even Analysis – Advantages.

UNIT IV:

Market Structure: Concept of Market – Classification of Markets -Perfect Competition – Characteristics – Equilibrium Price -Monopoly – Characteristics – Equilibrium Under Monopoly.

UNIT V:

National Income: Meaning – Definition – Measurements of National Income - Concepts of National Income - Components of National Income-Problems in Measuring National Income.

B.Com	Semester: II	Credits: 4
Course: 2C	BANKING THEORY AND PRACTICE	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the basic concepts of banks and functions of commercial banks.
- Demonstrate an awareness of law and practice in a banking context.
- Engage in critical analysis of the practice of banking law.
- Organize information as it relates to the regulation of banking products and services.
- Critically examine the current scenario of Indian Banking system.
- Formulate the procedure for better service to the customers from various banking innovations.

UNIT I:

Introduction: Meaning & Definition of Bank – Functions of Commercial Banks – Credit Creation with Examples - Kinds of Banks – Central Banking Vs. Commercial Banking.

UNIT II:

Banking Systems: Unit Banking, Branch Banking, Investment Banking - Innovations in Banking – E banking - Online and Offshore Banking, Internet Banking - Anywhere Banking - ATMs – RTGS-NEFT
– Mobile Banking.

UNIT III:

Types of Banks: Indigenous Banking - Cooperative Banks, Regional Rural Banks, SIDBI, NABARD - EXIM bank.

UNIT IV:

Banker and Customer: Meaning and Definition of Banker and Customer – Types of Customers – General Relationship and Special Relationship between Banker and Customer - KYC Norms.

UNIT V:

Collecting Banker and Paying Banker: Concepts - Duties & Responsibilities of Collecting Banker – Holder for Value – Holder in Due Course – Statutory Protection to Collecting Banker - Responsibilities of Paying Banker - Payment Gateways.

B.Com	Semester: III	Credits: 4
Course: 3A	ADVANCED ACCOUNTING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the concept of Non-profit organisations and its accounting process.
- Comprehend the concept of single-entry system and preparation of statement of affairs.
- Familiarize with the legal formalities at the time of dissolution of the firm .
- Prepare financial statements for partnership firm on dissolution of the firm.
- Employ critical thinking skills to understand the difference between the dissolution of the firm and dissolution of partnership.

UNIT I:

Accounting for Non Profit Organizations: Non Profit Entities- Meaning - Features of Non-Profit Entities –Provisions as per Sec 8 - Accounting Process- Preparation of Accounting Records - Receipts and Payments Account- Income and Expenditure Account - Preparation of Balance Sheet (including problems).

UNIT II:

Single Entry System: Features – Differences between Single Entry and Double Entry – Disadvantages of Single Entry- Ascertainment of Profit and Preparation of Statement of Affairs (including Problems).

UNIT III:

Hire Purchase System: Features –Difference between Hire Purchase and Instalment Purchase Systems - Accounting Treatment in the Books of Hire Purchaser and Hire Vendor - Default and Repossession (including Problems).

UNIT IV:

Partnership Accounts-I: Meaning – Partnership Deed - Fixed and Fluctuating Capitals-Accounting Treatment of Goodwill - Admission and Retirement of a Partner(including problems).

UNIT V:

Partnership Accounts-II: Dissolution of a Partnership Firm – Application of Garner v/s Murray Rule in

India – Insolvency of one or more Partners (including problems).

B.Com	Semester: III	Credits: 4
Course: 3B	BUSINESS STATISTICS	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the importance of Statistics in real life.
- Formulate complete, concise, and correct mathematical proofs.
- Frame problems using multiple mathematical and statistical tools, measuring relationships by using standard techniques.
- Build and assess data-based models.
- Learn and apply the statistical tools in day life.
- Create quantitative models to solve real world problems in appropriate contexts.

UNIT I:

Introduction to Statistics: Definition – Importance, Characteristics and Limitations of Statistics - Classification and Tabulation – Frequency Distribution Table -Diagrams and Graphic Presentation of Data (including problems)

UNIT II:

Measures of Central Tendency: Types of Averages – Qualities of Good Average - Mean, Median, Mode, and Median based Averages-Geometric Mean – Harmonic Mean(including problems)

UNIT III:

Measures of Dispersion: Meaning and Properties of Dispersion – Absolute and Relative Measures - Types of Dispersion-Range - Quartile Deviation (Semi – Inter Quartile Range) -Mean Deviation - Standard Deviation - Coefficient of Variation. (including problems)

UNIT IV:

Skewness and Kurtosis: Measures of Skewness: Absolute and Relative Measures- Co-efficient of Skewness:

Karl Pearson's, Bowley's and Kelly's - Kurtosis: Meso kurtosis, Platy kurtosis and Leptokurtosis (including problems)

UNIT V:

Measures of Relation: Meaning and use of Correlation – Types of Correlation - Karlpearson's Correlation Coefficient - Probable Error-Spearman's Rank-Correlation (including problems)

B.Com	Semester: III	Credits: 4
Course: 3C	MARKETING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Develop an idea about marketing and marketing environment.
- Understand the consumer behaviour and market segmentation process.
- Comprehend the product life cycle and product line decisions.
- Know the process of packaging and labeling to attract the customers.
- Formulate new marketing strategies for a specific new product.
- Develop new product line and sales promotion techniques for a given product.
- Design and develop new advertisements to given products.

UNITI:

Introduction: Concepts of Marketing: Need, Wants and Demand - Marketing Concepts – Marketing Mix - 4 P's of Marketing – Marketing Environment.

UNIT II:

Consumer Behaviour and Market Segmentation: Buying Decision Process – Stages – Buying

Behaviour – Market Segmentation –Bases of Segmentation - Selecting Segments – Advantages of Segmentation.

UNIT III:

Product Management: Product Classification – Levels of Product - Product Life Cycle - New Products, Product Mix and Product Line Decisions - Design, Branding, Packaging and Labelling.

UNIT IV:

Pricing Decision: Factors Influencing Price – Determination of Price - Pricing Strategies: Skimming and Penetration Pricing.

UNIT V:

Promotion and Distribution: Promotion Mix - Advertising - Sales promotion - Publicity – Public Relations - Personal Selling and Direct Marketing - Distribution Channels

Online Marketing

B.Com	Semester: IV	Credits: 4
Course: 4A	CORPORATE ACCOUNTING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the Accounting treatment of Share Capital and aware of process of book building.
- Demonstrate the procedure for issue of bonus shares and buyback of shares.
- Comprehend the important provisions of Companies Act, 2013 and prepare final accounts of a company with Adjustments.
- Participate in the preparation of consolidated accounts for a corporate group.

- Understand analysis of complex issues, formulation of well-reasoned arguments and reaching better conclusions.
- Communicate accounting policy choices with reference to relevant laws and accounting standards.

UNIT I:

Accounting for Share Capital: Kinds of Shares – Types of Preference Shares – Issue of Shares at Par, Discount and Premium - Forfeiture and Reissue of Shares (including problems).

UNIT II:

Issue and Redemption of Debentures and Issue of Bonus Shares: Accounting Treatment for Debentures Issued and Repayable at Par, Discount and Premium -Issue of Bonus Shares - Buyback of Shares - (including problems).

UNIT III:

Valuation of Goodwill: Need and Methods - Average Profit Method, Super Profits Method – Capitalization Method and Annuity Method (Including problems).

UNIT IV:

Valuation Shares: Need for Valuation - Methods of Valuation - Net Assets Method, Yield Basis Method, Fair Value Method (including problems).

UNIT V:

Company Final Accounts: Provisions of the Companies Act, 2013 - Preparation of Final Accounts – Adjustments Relating to Preparation of Final Accounts – Profit and Loss Account and Balance Sheet – (including problems with simple adjustments).

B.Com	Semester: IV	Credits: 4
Course: 4B	COST AND MANAGEMENT ACCOUNTING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand various costing methods and management techniques.

- Apply Cost and Management accounting methods for both manufacturing and service industry.
- Prepare cost sheet, quotations, and tenders to organization for different works.
- Analyze cost-volume-profit techniques to determine optimal managerial decisions.
- Compare and contrast the financial statements of firms and interpret the results.
- Prepare analysis of various special decisions, using relevant management techniques.

UNIT I:

Introduction: Cost Accounting: Definition – Features – Objectives – Functions – Scope – Advantages and Limitations - Management Accounting: Features – Objectives – Functions –
Elements of Cost - Preparation of Cost Sheet (including problems)

UNIT II:

Material and Labour Cost: Techniques of Inventory Control – Valuation of Material Issues: FIFO - LIFO - Simple and Weighted Average Methods. Labour: Direct and Indirect Labour Cost – Methods of Payment of Wages- Incentive Schemes -Time Rate Method, Piece Rate Method, Halsey, Rowan Methods and Taylor Methods only(including problems)

UNIT III:

Job Costing and Batch Costing: Definition and Features of Job Costing – Economic Batch Quantity (EBQ) – Preparation of Job Cost Sheet – Problems on Job Cost Sheet and Batch Costing(including problems)

UNIT IV:

Financial Statement Analysis and Interpretation:Financial Statements - Features, Limitations. Need, Meaning, Objectives, and Process of Financial Statement Analysis- Comparative Analysis – Common Size Analysis and Trend Analysis (including problems)

UNIT V:

Marginal Costing: Meaning and Features of Marginal Costing – Contribution –Profit Volume Ratio- Break Even Point – Margin of Safety – Estimation of Profit and Estimation of Sales(including problems).

SRI DNR GDC(W) PALAKOL

B.Com	Semester: IV	Credits: 4
Course: 4C	INCOME TAX	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Acquire the complete knowledge of the tax evasion, tax avoidance and tax planning.
- Understand the provisions and compute income tax for various sources.
- Grasp amendments made from time to time in Finance Act.
- Compute total income and define tax complicacies and structure.
- Prepare and File IT returns of individual at his own.

UNIT I:

Introduction: Income Tax Act-1961 - Basic Concepts: Income, Person, Assessee - Assessment Year, Previous Year, Rates of Tax, Agricultural Income,ResidentialStatusof Individual -Incidence of Tax – Incomes Exempt from Tax (theory only).

UNIT II:

Income from Salaries: Basis of Charge, Tax Treatment of Different Types of Salaries Allowances, Perquisites, Profits in Lieu of Salary, Deductions from Salary Income, Computation of Salary Income (including problems).

UNIT III:

Income from House Property and Profits and Gains from Business: Annual Value, Let-out/Self Occupied/Deemed to be Let-out house -Deductions from Annual Value - Computation of Income from House Property, Definition of Business and Profession – Procedure for Computation of Income from Business – Revenue and Capital Nature of Incomes and Expenses – Allowable Expenses – Expenses Expressly Disallowed – Computation (including problems).

UNIT IV:

Income from Capital Gains - Income from Other Sources: Meaning of Capital Asset – Types – Procedure for Computation of Long-term and Short-term Capital Gains/Losses

Meaning of Other Sources - General Incomes – Specific Incomes – Computation (including problems).

UNIT V: Computation of Total Income of an Individual: Deductions under Section 80 - Computation of Total Income (Simple problems).

B.Com	Semester: IV	Credits: 4
Course: 4D	BUSINESS LAW	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the legal environment of business and laws of business.
- Highlight the security aspects in the present cyber-crime scenario.
- Apply basic legal knowledge to business transactions.
- Understand the various provisions of Company Law.
- Engage critical thinking to predict outcomes and recommend appropriate action on issues relating to business associations and legal issues.
- Integrate concept of business law with foreign trade.

UNIT I:

Contract: Meaning and Definition of Contract - Essential Elements of Valid Contract -Valid, Void and Voidable Contracts - Indian Contract Act, 1872

UNIT II:

Offer, Acceptance and Consideration: Definition of Valid Offer, Acceptance and Consideration - Essential Elements of a Valid Offer, Acceptance and Consideration.

UNIT III:

Capacity of the Parties and Contingent Contract:

Rules Regarding to Minors Contracts - Rules Relating to Contingent Contracts - Different Modes of Discharge of Contracts - Rules Relating to Remedies to Breach of Contract.

UNIT IV:

Sale of Goods Act 1930 and Consumer Protection Act 2019:

Contract of Sale - Sale and Agreement to Sell - Implied Conditions and Warranties - Rights of Unpaid Vendor- Definition of Consumer - Person - Goods - Service - Consumer Dispute - Consumer Protection Councils - Consumer Dispute Redressal Mechanism.

UNIT V:

Cyber Law: Overview and Need for Cyber Law - Contract Procedures - Digital Signature-Safety Mechanisms.

B.Com	Semester: IV	Credits: 4
Course: 4E	AUDITING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understanding the meaning and necessity of audit in modernera.
- Comprehend the role of auditor in avoiding the corporate frauds.
- Identify the steps involved in performing audit process.
- Determine the appropriate audit report for a given audit situation.
- Apply auditing practices to different types of business entities.
- Plan an audit by considering concepts of evidence, risk and materiality

UNIT I:

Introduction: Meaning – Objectives – Importance of Auditing – Characteristics - Book Keeping vs Auditing - Accounting vs Auditing – Role of Auditor in Checking Corporate Frauds.

UNIT II:

Types of Audit: Based on Ownership, Time and Objective - Independent, Financial, Internal, Cost,Tax, Government, Secretarial Audits

UNIT III:

Planning of Audit: Steps to be taken at the Commencement of a New Audit – Audit Programme - Audit Note Book– Audit Working Courses - Audit Evidence - Internal Check, Internal Audit and Internal Control.

UNIT IV:

Vouching and Investigation: Definition and Importance of Vouching – Objectives of Vouching - Vouching of Cash and Trading Transactions – Investigation - Auditing vs. Investigation

UNIT V:

Company Audit and Auditors Report: Auditor's Qualifications – Appointment andReappointment – Rights, Duties, Liabilities and Disqualifications - Audit Report: Contents –Preparation - Relevant Provisions of Companies Act, 2013.

B.Com	Semester: IV	Credits: 4
Course: 4F	GOODS AND SERVICES TAXES	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the basic principles underlying the Indirect Taxation Statutes.
- Examine the method of tax credit. Input and Output Tax credit and Cross Utilisation of Input Tax Credit.
- Identify and analyze the procedural aspects under different applicable statutes related to GST.
- Compute the assessable value of transactions related to goods and services for levy and determination of duty liability.
- Develop various GST Returns and reports for business transactions in Tally.

UNIT I: Introduction: Overview of GST - Concepts –Taxes Subsumed under GST – Components of GST- GST Council- Advantages of GST-GST Registration.

UNIT II: GST Principles –Vijay Kelkar Sha Committee Recommendations - Comprehensive Structure of GST Model in India: Single, Dual GST – GST Rates - Taxes Exempted from GST-Taxes and Duties outside the purview of GST- Taxation of Services

UNIT III: Tax Invoice- Bill of Supply-Transactions Covered under GST-Composition Scheme-Reverse Charge Mechanism- Composite Supply -Mixed Supply.

UNIT IV: Time of Supply of Goods & Services: Value of Supply - Input Tax Credit - Distribution of Credit -Matching of Input Tax Credit - Availability of Credit in Special Circumstances- Cross utilization of ITC between the Central GST and the State GST.

UNIT V: GST Returns: Regular Monthly Filing Returns-Composition Quarterly Filing Returns-GSTR- 1, GSTR-2, GSTR 2A, GSTR-3, GSTR 3B -Annual Returns GSTR-9, GSTR 9A, GSTR 9B& GSTR 9C

Records to be Maintained under GST.

SRI DNR GDC(W) PALAKOL

B. Com
COMPUTER APPLICATIONS

DETAILS OF COURSES TITLES AND CREDITS

Sem	Course No	Course Name	Course Type (T/P/L)	Hrs/Week	Credits	Max. Marks	Max. Marks
				Commerce :5	Commerce :4	Count/Internal/ Mid Assessment	Sem- End Exam
I	1A	Fundamentals of Accounting	T	5	4	25	75
	1B	Business Organization and Management	T	5	4	25	75
	1C	Information Technology	T+L	3+2	3+1	25	75
II	2A	Financial Accounting	T	5	4	25	75
	2B	Business Economics	T	5	4	25	75
	2C	E-Commerce and Web Designing	T+L	3+2	3+1	25	75
III	3A	Advanced Accounting	T	5	4	25	75
	3B	Business Statistics	T	5	4	25	75
	3C	Programming with C &C++	T+L	3+2	3+1	25	75
IV	4A	Corporate Accounting	T	5	4	25	75
	4B	Cost and Management Accounting	T	5	4	25	75
	4C	Income Tax	T	5	4	25	75
	4D	Business Laws	T	5	4	25	75
	4E	Auditing	T	5	4	25	75
	4F	Data Base Management System	T+L	3+2	3+1	25	75

Note: * Course Type Code : T-Theory, L - Lab, P: Problem solving

SRI DNR GDC(W) PALAKOL

B.Com	Semester: I	Credits: 4
Course: 1A	FUNDAMENTALS OF ACCOUNTING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to

- Identify transactions and events that need to be recorded in the books of accounts.
- Equip with the knowledge of accounting process and preparation of final accounts of sole trader.
- Develop the skill of recording financial transactions and preparation of reports in accordance with GAAP.
- Analyze the difference between cash book and pass book in terms of balance and make reconciliation.
- Critically examine the balance sheets of a sole trader for different accounting periods.
- Design new accounting formulas & principles for business organisations.

UNIT I:

Introduction : Need for Accounting – Definition – Objectives, – Accounting Concepts and Conventions – GAAP - Accounting Cycle - Classification of Accounts and its Rules – BookKeeping and Accounting - Double Entry Book-Keeping - Journalizing - Posting to Ledgers, Balancing of Ledger Accounts (including Problems).

UNIT II:

S**ubsidiary Books:** Types of Subsidiary Books - Cash Book, Three-column Cash Book- Petty Cash Book(including Problems).

UNIT III:

Trial Balance and Rectification of Errors: Preparation of Trial balance - Errors – Meaning – Types of Errors – Rectification of Errors – Suspense Account (including Problems)

UNIT IV:

Bank Reconciliation Statement: Need for Bank Reconciliation - Reasons for Difference between CashBook and Pass Book Balances- Preparation of Bank Reconciliation Statement - Problems on both Favourable and Unfavourable Balance (including Problems).

UNIT V:

Final Accounts: Preparation of Final Accounts: Trading account – Profit and Loss account – BalanceSheet – Final Accounts with Adjustments (including Problems).

SRI DNR GDC(W) PALAKOL

B.Com	Semester: I	Credits: 4
Course: 1B	BUSINESS ORGANIZATION AND MANAGEMENT	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will be able to:

- Understand different forms of business organizations.
- Comprehend the nature of Joint Stock Company and formalities to promote a Company.
- Describe the Social Responsibility of Business towards the society.
- Critically examine the various organizations of the business firms and judge the best among them.
- Design and plan to register a business firm. Prepare different documents to register a company at his own.
- Articulate new models of business organizations.

UNIT I:

Introduction Concepts of Business, Trade, Industry and Commerce: Business – Meaning, Definition, Features and Functions of Business - Trade Classification – Aids to Trade – Industry Classification and Commerce - Factors Influencing the Choice of Suitable form of Organisation.

UNIT II:

Forms of Business Organizations: Features, Merits and Demerits of Sole Proprietor Ship and Partnership Business - Features Merits and Demits of Joint Stock Companies - Public Sector Enterprises (PSEs) - Multinational Corporations (MNCs)- Differences between Private Limited Public Limited Company.

UNIT III:

C**ompany Incorporation:** Preparation of Important Documents for Incorporation of Company - Certificate of Incorporation and Certificate of Commencement of Business - Contents of Memorandum and Articles of Association - Contents of Prospectus.

UNIT IV:

Management: Meaning Characteristics - Fayol's 14 Principles of Management - Administration Vs Management - Levels of Management.

UNIT V:

Functions of Management: Different Functions of Management - Meaning – Definition – Characteristics Merits and Demits of Planning - Principles of Organisation – Line and staff of Organisation.

SRI DNR GDC(W) PALAKOL

B Com	Semester: I(Computer Applications)	Credits: 4
Course: 1C	INFORMATION TECHNOLOGY	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the students is expected to DEMONSTRATE the following cognitive abilities (thinking skill) and psychomotor skills.

A. Remembers and states in a systematic way (Knowledge).

1. Describe the fundamental hardware components that make up a computer's hardware and the role of each of these components.
2. Understand the difference between an operating system and an application program, and what each is used for in a computer.
3. Use technology ethically, safely, securely, and legally.
4. Use systems development, word-processing, spreadsheet, and presentation software to solve basic information systems problems.

B. Explains (Understanding).

5. Apply standard statistical inference procedures to draw conclusions from data.
6. Retrieve information and create reports from databases.
7. Interpret, produce, and present work-related documents and information effectively and accurately

C. Critically examines, using data and figures (Analysis and Evaluation**).

8. Analyse compression techniques and file formats to determine effective ways of securing, managing, and transferring data.
9. Identify and analyse user needs and to take them into account in the selection, creation, integration, evaluation, and administration of computing based systems.
10. Analyse a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
11. Identify and analyse computer hardware, software

D. Working in 'Outside Syllabus ***Area' under a Co-curricular Activity*****(Creativity)** Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

E. Efficiently learn and use Microsoft Office applications.

UNIT I:

Introduction: Computer Definition - Characteristics and Limitations of Computer Hardware— Generations of Computer, Classification of Computers, Applications of Computer, Basic Componentsof PC, Computer Architecture - Primary and Secondary Memories- Input and Output Devices- Operating System- Function of Operating System- Types of Operating System- Languages and its Types.

UNIT II:

MS word: Word Processing – Features-Advantages and Applications- Parts of Word Window-Toolbar- Creating, Saving, Closing, Opening and Editing of a Document-Moving and Coping a Text-Formatting of Text and Paragraph- Bullets and Numbering-Find and Replace - Insertion of objects-Headers and Footers- Page Formatting- Auto Correct- Spelling and Grammar- Mail Merge-Macros.

UNIT III:

MS Excel:

Features – Spread Sheet-Workbook – Cell-Parts of a window-Saving, Closing, Opening of a Work Book – Editing – Advantages – Formulas- Types of Function- Templates – Macros – Sorting- Charts – Filtering – Consolidation – Grouping- Pivot Table.

UNIT IV:

MS Power point: Introduction – Starting – Parts-Creating of Tables- Create Presentation – Templates- Auto Content Wizard-Slide Show-Editing of Presentation-Inserting Objects and charts.

UNIT V:

MS Access: Orientation to Microsoft Access - Create a Simple Access Database - Working with Table Data - Modify Table Data - Sort and Filter Records - Querying a Database - Create Basic Queries - Sort and Filter Data in a Query - Perform Calculations in a Query - Create Basic Access Forms - Work with Data on Access Forms - Create a Report - Add Controls to a Report - Format Reports.

B Com	Semester: II	Credits: 4
Course: 2A	FINANCIAL ACCOUNTING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course the student will able to:

- Understand the concept of consignment and learn the accounting treatment of the various aspects of consignment.
- Analyze the accounting process and preparation of accounts in consignment and joint venture.
- Distinguish Joint Venture and Partnership and to learn the methods of maintaining records under Joint Venture.
- Determine the useful life and value of the depreciable assets and maintenance of Reserves in business entities.
- Design an accounting system for different models of businesses at his own using the principles of existing accounting system.

UNIT I:

Depreciation: Meaning and Causes of Depreciation - Methods of Depreciation: Straight Line – Written Down Value –Annuity and Depletion Method (including Problems).

UNIT II:

Provisions and Reserves: Meaning – Provision vs. Reserve – Preparation of Bad Debts Account – Provision for Bad and Doubtful Debts – Provision for Discount on Debtors– Provision for Discount on Creditors - Repairs and Renewals Reserve A/c (including Problems).

UNIT III:

Bills of Exchange: Meaning of Bill – Features of Bill – Parties in the Bill – Discounting of Bill – Renewal of Bill – Entries in the Books of Drawer and Drawee (including Problems).

UNIT IV:

Consignment Accounts: Consignment - Features - Proforma Invoice - Account Sales – Del-credere Commission - Accounting Treatment in the Books of Consigner and Consignee - Valuation of Closing Stock - Normal and Abnormal Losses (including Problems).

UNIT V:

Joint Venture Accounts: JointVenture - Features - Difference between Joint- Venture and Consignment – Accounting Procedure – Methods of Keeping Records–One Vendor Keeps the Accounts and Separate Set off Books Methods (including Problems).

SRI DNR GDC(W) PALAKOL

B Com	Semester: II	Credits: 4
Course: 2B	BUSINESS ECONOMICS	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Describe the nature of economics in dealing with the issues of scarcity of resources.
- Analyze supply and demand analysis and its impact on consumer behaviour.
- Evaluate the factors, such as production and costs affecting firms behaviour.
- Recognize market failure and the role of government in dealing with those failures.
- Use economic analysis to evaluate controversial issues and policies.
- Apply economic models for managerial problems, identify their relationships, and formulate the decision making tools to be applied for business.

UNIT I:

Introduction: Meaning and Definitions of Business Economics - Nature and Scope of Business Economics - Micro and Macro Economics and their Interface.

UNIT II:

Demand Analysis: Meaning and Definition of Demand – Determinants to Demand –Demand Function -Law of Demand – Demand Curve – Exceptions to Law of Demand - Elasticity of Demand – Measurements of Price Elasticity of Demand.

UNIT III:

Production, **Cost and Revenue Analysis**: Concept of Production Function – Law of Variable Proportion - Law of Returns to Scale - Classification of Costs -Break Even Analysis – Advantages.

UNIT IV:

Market Structure: Concept of Market – Classification of Markets -Perfect Competition – Characteristics – Equilibrium Price -Monopoly – Characteristics – Equilibrium Under Monopoly.

UNIT V:

National Income: Meaning – Definition – Measurements of National Income - Concepts of National Income -Components of National Income-Problems in Measuring National Income.

B Com	Semester: II(Computer Applications)	Credits: 4
Course: 2C	E-COMMERCE AND WEB DESIGNING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the students is expected to DEMONSTRATE the following cognitive abilities (thinking skill) and psychomotor skills.

A. Remembers and states in a systematic way (Knowledge).

1. Understand the foundations and importance of E-commerce.
2. Define Internet trading relationships including Business to Consumer, Business- to-Business, Intra-organizational.
3. Describe the infrastructure for E-commerce.
4. Discuss legal issues and privacy in E-Commerce.
5. Understand the principles of creating an effective web page, including an in-depth consideration of information architecture

B. Explains (Understanding).

6. Recognize and discuss global E-commerce issues.
7. Learn the language of the web: HTML and CSS.

C. Critically examines, using data and figures (Analysis and Evaluation).

8. Analyze the impact of E-commerce on business models and strategy.
9. Assess electronic payment systems.
10. Exploring a web development framework as an implementation example and create dynamically generated web site complete with user accounts, page level security, modular design using css

D. Working in 'Outside Syllabus ***Area' under a Co-curricular Activity*****(**Creativity) Use the Systems

Design Approach to implement websites with the following steps:

- Define purpose of the site and subsections.
- Identify the audience.
- Design and/or collect site content.
- Design the website theme and navigational structure.
- Design & develop web pages including: CSS Style Rules, Typography, Hyperlinks, Lists, Tables, Frames, Forms, Images, Behaviours, CSS Layouts

E. Build a site based on the design decisions and progressively incorporate tools and techniques covered.

UNIT I:

Introduction: Meaning, Nature, Concepts, Advantages, Disadvantages and reasons for Transacting Online, Types of E-Commerce, e-commerce Business Models (Introduction , Key Elements of a Business Model And Categorizing Major E-Commerce Business Models), Forces Behind e-commerce.

Technology used in E-commerce: The dynamics of World Wide Web and Internet (Meaning, EvolutionAnd Features); Designing, Building and Launching e-commerce website (A systematic approach involving decisions regarding selection of hardware, software, outsourcing Vs. in-house development of a website).

UNIT II:

E-payment System: Models and methods of e–payments (Debit Card, Credit Card, Smart Cards, e-money), Digital Signatures (Procedure, Working And Legal Position), Payment Gateways, Online Banking (Meaning, Concepts, Importance, Electronic Fund Transfer, Automated Clearing House, Automated Ledger Posting), Risks Involved in e-payments.

UNIT III:

On-line Business Transactions: Meaning, Purpose, Advantages and Disadvantages of Transacting Online, E- Commerce Applications in Various Industries Like {Banking, Insurance, Payment of Utility Bills, Online Marketing, E-Tailing (Popularity, Benefits, Problems and Features), Online Services

(Financial, Travel and Career), Auctions, Online Portal, Online Learning, Publishing and Entertainment} Online Shopping (Amazon, Snap Deal, Alibaba, Flipkart, etc.).

UNIT IV:

Website designing: Designing a home page, HTML document, Anchor tag Hyperlinks, Head and body section, Header Section, Title, Prologue, Links, Colorful Pages, Comment, Body Section, Heading Horizontal Ruler, Paragraph, Tabs, Images And Pictures, Lists and Their Types, Nested Lists, Table Handling. **Frames:** Frameset Definition, Frame Definition, Nested Framesets, Forms and Form Elements. DHTML and Style Sheets: Defining Styles, elements of Styles, linking a style sheet to a HTML Document, Inline Styles, External Style Sheets, Internal Style Sheets & Multiple Style Sheets.

UNIT V:

Security and Encryption: Need and Concepts, E-Commerce Security Environment: (Dimension, Definition and Scope Of E-Security), Security Threats in The E-Commerce Environment (Security Intrusions And Breaches, Attacking Methods Like Hacking, Sniffing, Cyber- Vandalism Etc.), Technology Solutions (Encryption, Security Channels Of Communication, Protecting Networks And Protecting Servers And Clients).

SRI DNR GDC(W) PALAKOL

B Com	Semester: III	Credits: 4
Course: 3A	ADVANCED ACCOUNTING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the concept of Non-profit organisations and its accounting process.
- Comprehend the concept of single-entry system and preparation of statement of affairs.
- Familiarize with the legal formalities at the time of dissolution of the firm .
- Prepare financial statements for partnership firm on dissolution of the firm.
- Employ critical thinking skills to understand the difference between the dissolution of the firm and dissolution of partnership.

UNIT I:

Accounting for Non Profit Organizations: Non Profit Entities- Meaning - Features of Non-Profit Entities –Provisions as per Sec 8 - Accounting Process- Preparation of Accounting Records - Receipts and Payments Account- Income and Expenditure Account - Preparation of Balance Sheet (including problems).

UNIT II:

Single Entry System: Features – Differences between Single Entry and Double Entry – Disadvantages of Single Entry- Ascertainment of Profit and Preparation of Statement of Affairs (including Problems).

UNIT III:

Hire Purchase System: Features –Difference between Hire Purchase and Instalment Purchase Systems - Accounting Treatment in the Books of Hire Purchaser and Hire Vendor - Default and Repossession (including Problems).

UNIT IV:

Partnership Accounts-I: Meaning – Partnership Deed - Fixed and Fluctuating Capitals-AccountingTreatment of Goodwill - Admission and Retirement of a Partner(including problems).

UNIT V:

Partnership Accounts-II: Dissolution of a Partnership Firm – Application of Garner v/s Murray Rule inIndia – Insolvency of one or more Partners (including problems).

B Com	Semester: III	Credits: 4
Course: 3B	BUSINESS STATISTICS	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the importance of Statistics in real life.
- Formulate complete, concise, and correct mathematical proofs.
- Frame problems using multiple mathematical and statistical tools, measuring relationships by using standard techniques.
- Build and assess data-based models.
- Learn and apply the statistical tools in day life.
- Create quantitative models to solve real world problems in appropriate contexts.

UNIT I:

Introduction to Statistics: Definition – Importance, Characteristics and Limitations of Statistics - Classification and Tabulation – Frequency Distribution Table -Diagrams and Graphic Presentation of Data (including problems)

UNIT II:

Measures of Central Tendency: Types of Averages – Qualities of Good Average - Mean, Median, Mode, and Median based Averages-Geometric Mean – Harmonic Mean(including problems)

UNIT III:

Measures of Dispersion: Meaning and Properties of Dispersion – Absolute and Relative Measures - Types of Dispersion-Range - Quartile Deviation (Semi – Inter Quartile Range) -Mean Deviation - Standard Deviation - Coefficient of Variation. (including problems)

UNIT IV:
Skewness and Kurtosis: Measures of Skewness: Absolute and Relative Measures- Co-efficient of Skewness: Karl Pearson's, Bowley's and Kelly's - Kurtosis: Meso kurtosis, Platy kurtosis and Leptokurtosis (including problems)
UNIT V:Measures of Relation: Meaning and use of Correlation – Types of Correlation - Karlpearson's Correlation Coefficient - Probable Error-Spearman's Rank-Correlation (including problems)

B Com	Semester: III(Computer Applications)	Credits: 4
Course: 3C	PROGRAMMING WITH C &C++	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the students is expected to DEMONSTRATE the following cognitive abilities (thinking skill) and psychomotor skills.

A. Remembers and states in a systematic way (Knowledge).

1. Develop programming skills.
2. Declaration of variables and constants use of operators and expressions.
3. learn the syntax and semantics of programming language.
4. Be familiar with programming environment of C and C++.
5. Ability to work with textual information (characters and strings) & arrays

B. Explains (Understanding).

6. Understanding a functional hierarchical code organization.
7. Understanding a concept of object thinking within the framework of functional model.
8. Write program on a computer, edit, compile, debug, correct, recompile and run it

C. Critically examines, using data and figures (Analysis and Evaluation).

9. Choose the right data representation formats based on the requirements of the problem.
10. Analyze how C++ improves C with object-oriented features.
11. Evaluate comparisons and limitations of the various programming constructs and choose correct one for the task in hand.

D. Working in 'Outside Syllabus ***Area' under a Co-curricular Activity***(Creativity) Planning of structure and content, writing, updating and modifying computer programs for user solutions

E. Exploring C programming and Design C++ classes for code reuse (Practical skills***).

UNIT I:

Introduction and Control Structures: History of 'C' - Structure of C program – C character set, Tokens, Constants, Variables, Keywords, Identifiers – C data types - C operators - Standard I/O in C -Applying if and Switch Statements.

UNIT II:

Loops And Arrays: Use of While, Do While and For Loops - Use of Break and Continue Statements -Array Notation and Representation - Manipulating Array Elements - Using Multi Dimensional Arrays.

UNIT III:

Strings and Functions: Declaration and Initialization of String Variables - String Handling Functions - Defining Functions - Function Call - Call By Value, Call By Reference – Recursion.

UNIT IV:

Principles of Object Oriented Programming: Procedure Oriented Programming, Object Oriented Programming, Basic concepts of Object Oriented Programming, Applications of C++, A simple C++ Program, An example with Class, Structure of C++ Program, Creating source file, Compiling and Linking.

UNIT V:

Classes and Objects: Tokens, Keywords, Declaration of Variables, Dynamic initialization of

variables, Specifying a Class, Defining member functions, Function overloading, Operator overloading, Constructors and Destructors, Inheritance and types of Inheritance.

B Com	Semester: IV	Credits: 4
Course: 4A	CORPORATE ACCOUNTING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the Accounting treatment of Share Capital and aware of process of book building.
- Demonstrate the procedure for issue of bonus shares and buyback of shares.
- Comprehend the important provisions of Companies Act, 2013 and prepare final accounts of a company with Adjustments.
- Participate in the preparation of consolidated accounts for a corporate group.
- Understand analysis of complex issues, formulation of well-reasoned arguments and reaching better conclusions.
- Communicate accounting policy choices with reference to relevant laws and accounting standards.

UNIT I:

Accounting for Share Capital: Kinds of Shares – Types of Preference Shares – Issue of Shares at Par, Discount and Premium - Forfeiture and Reissue of Shares (including problems).

UNIT II:

Issue and Redemption of Debentures and Issue of Bonus Shares: Accounting Treatment for Debentures Issued and Repayable at Par, Discount and Premium -Issue of Bonus Shares - Buyback of Shares - (including problems).

UNIT III:

Valuation of Goodwill: Need and Methods - Average Profit Method, Super Profits Method – Capitalization Method and Annuity Method (Including problems).

UNIT IV:

Valuation Shares: Need for Valuation - Methods of Valuation - Net Assets Method, Yield Basis Method,Fair Value Method (including problems).

UNIT V:

Company Final Accounts: Provisions of the Companies Act, 2013 - Preparation of Final Accounts – Adjustments Relating to Preparation of Final Accounts – Profit and Loss Account and Balance Sheet – (including problems with simple adjustments).

B Com	Semester: IV	Credits: 4
Course: 4B	COST AND MANAGEMENT ACCOUNTING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand various costing methods and management techniques.
- Apply Cost and Management accounting methods for both manufacturing and service industry.
- Prepare cost sheet, quotations, and tenders to organization for different works.
- Analyze cost-volume-profit techniques to determine optimal managerial decisions.
- Compare and contrast the financial statements of firms and interpret the results.
- Prepare analysis of various special decisions, using relevant management techniques.

UNIT I:

Introduction: Cost Accounting: Definition – Features – Objectives – Functions – Scope – Advantages and Limitations - Management Accounting: Features – Objectives – Functions –
Elements of Cost - Preparation of Cost Sheet (including problems)

UNIT II:

Material and Labour Cost: Techniques of Inventory Control – Valuation of Material Issues: FIFO - LIFO - Simple and Weighted Average Methods. Labour: Direct and Indirect Labour Cost – Methods of Payment of Wages- Incentive Schemes -Time Rate Method, Piece Rate Method, Halsey, Rowan Methods and Taylor Methods only(including problems)

UNIT III:

Job Costing and Batch Costing: Definition and Features of Job Costing – Economic Batch Quantity (EBQ) – Preparation of Job Cost Sheet – Problems on Job Cost Sheet and Batch Costing(including problems)

UNIT IV:

Financial Statement Analysis and Interpretation:Financial Statements - Features, Limitations. Need, Meaning, Objectives, and Process of Financial Statement Analysis- Comparative Analysis – Common Size Analysis and Trend Analysis (including problems)

UNIT V:

Marginal Costing: Meaning and Features of Marginal Costing – Contribution –Profit Volume Ratio- Break Even Point – Margin of Safety – Estimation of Profit and Estimation of Sales(including problems).

B Com	Semester: IV	Credits: 4
Course: 4C	INCOME TAX	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Acquire the complete knowledge of the tax evasion, tax avoidance and tax planning.
- Understand the provisions and compute income tax for various sources.
- Grasp amendments made from time to time in Finance Act.
- Compute total income and define tax complicacies and structure.
- Prepare and File IT returns of individual at his own.

UNIT I:

Introduction: Income Tax Act-1961 - Basic Concepts: Income, Person, Assessee - Assessment Year, Previous Year, Rates of Tax, Agricultural Income,ResidentialStatusof Individual -Incidence of Tax – Incomes Exempt from Tax (theory only).

UNIT II:

Income from Salaries: Basis of Charge, Tax Treatment of Different Types of Salaries Allowances, Perquisites, Profits in Lieu of Salary, Deductions from Salary Income, Computation of Salary Income (including problems).

UNIT III:

Income from House Property and Profits and Gains from Business: Annual Value, Let-out/Self Occupied/Deemed to be Let-out house -Deductions from Annual Value - Computation of Income from House Property, Definition of Business and Profession – Procedure for Computation of Income from Business – Revenue and Capital Nature of Incomes and Expenses – Allowable Expenses – Expenses Expressly Disallowed – Computation (including problems).

UNIT IV:

Income from Capital Gains - Income from Other Sources: Meaning of Capital Asset – Types – Procedure for Computation of Long-term and Short-term Capital Gains/Losses
Meaning of Other Sources - Computer applications Incomes – Specific Incomes – Computation (including problems).

UNIT V: Computation of Total Income of an Individual: Deductions under Section 80– Computation

of Total Income (Simple problems).

B Com	Semester: IV	Credits: 4
Course: 4D	BUSINESS LAW	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understand the legal environment of business and laws of business.
- Highlight the security aspects in the present cyber-crime scenario.
- Apply basic legal knowledge to business transactions.
- Understand the various provisions of Company Law.
- Engage critical thinking to predict outcomes and recommend appropriate action on issues relating to business associations and legal issues.
- Integrate concept of business law with foreign trade.

UNIT I:

Contract: Meaning and Definition of Contract - Essential Elements of Valid Contract -Valid, Void and Voidable Contracts - Indian Contract Act, 1872

UNIT II:

Offer, Acceptance and Consideration: Definition of Valid Offer, Acceptance and Consideration - Essential Elements of a Valid Offer, Acceptance and Consideration.

UNIT III:

Capacity of the Parties and Contingent Contract:

Rules Regarding to Minors Contracts - Rules Relating to Contingent Contracts - Different Modes of Discharge of Contracts - Rules Relating to Remedies to Breach of Contract.

UNIT IV:

Sale of Goods Act 1930 and Consumer Protection Act 2019:

Contract of Sale - Sale and Agreement to Sell - Implied Conditions and Warranties - Rights of Unpaid Vendor- Definition of Consumer - Person - Goods - Service - Consumer Dispute - Consumer Protection Councils - Consumer Dispute Redressal Mechanism.

UNIT V:

Cyber Law: Overview and Need for Cyber Law - Contract Procedures - Digital Signature-Safety Mechanisms.

B Com	Semester: IV	Credits: 4
Course: 4E	AUDITING	Hrs/Wk: 5

Learning Outcomes:

At the end of the course, the student will able to:

- Understanding the meaning and necessity of audit in modern era.
- Comprehend the role of auditor in avoiding the corporate frauds.
- Identify the steps involved in performing audit process.
- Determine the appropriate audit report for a given audit situation.
- Apply auditing practices to different types of business entities.
- Plan an audit by considering concepts of evidence, risk and materiality

UNIT I:

Introduction: Meaning – Objectives – Importance of Auditing – Characteristics - Book Keeping vs Auditing - Accounting vs Auditing – Role of Auditor in Checking Corporate Frauds.

UNIT II:

Types of Audit: Based on Ownership, Time and Objective - Independent, Financial, Internal, Cost,Tax, Government, Secretarial Audits

UNIT III:

Planning of Audit: Steps to be taken at the Commencement of a New Audit – Audit Programme - Audit Note Book– Audit Working Courses - Audit Evidence - Internal Check, Internal Audit and Internal Control.

UNIT IV:

Vouching and Investigation: Definition and Importance of Vouching – Objectives of Vouching - Vouching of Cash and Trading Transactions – Investigation - Auditing vs. Investigation

UNIT V:

Company Audit and Auditors Report: Auditor's Qualifications – Appointment andReappointment – Rights, Duties, Liabilities and Disqualifications - Audit Report: Contents –Preparation - Relevant Provisions of Companies Act, 2013.

B Com	Semester: IV(Computer Applications)	Credits: 4
Course: 4F	DATA BASE MANAGEMENT SYSTEMS	Hrs/Wk: 5

Learning Outcomes for Database Management System.

At the end of the course, the students is expected to DEMONSTRATE the following cognitive abilities (thinking skill) and psychomotor skills.

A. Remembers and states in a systematic way (Knowledge.

1. Understand the role of a database management system in an organization.
2. Understand basic database concepts, including the structure and operation of the relational data model.
3. Understand and successfully apply logical database design principles, including ER diagrams and database normalization.
4. Understand Functional Dependency and Functional Decomposition

***B.* Explains (Understanding).**

5. To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

6. Perform PL/SQL programming using concept of Cursor Management, Error Handling, Packages.

C. **Critically examines, using data and figures (Analysis and Evaluation).**

7. Apply various Normalization techniques.
8. Model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model

D. Working in 'Outside Syllabus ***Area' under a Co-curricular Activity***(Creativity) Design and implement a small database project

E. Construct simple and moderately advanced database queries using Structured Query Language (SQL)(Practical skills)

UNIT I:

Overview of Database Management System: Introduction, Data and Information, Database, Database Management System, Objectives of DBMS, Evolution of Database Management System, Classification of Database Management System.

UNIT II:

File-Based System: File Based System. Drawbacks of File-Based System, DBMS Approach, Advantage of DBMS, Data Models, Components of Database System, Database Architecture,DBMS Vendors and their products.

UNIT III:

Entity-Relationship Model: Introduction, The Building Blocks of an Entity-Relationship, Classification of Entity Set, Attribute Classification, Relationship Degree, Relationship Classification, Generalization and Specialization, Aggregation and Composition, CODD's Rules, Relational Data Model, Concept of Relational Integrity.

UNIT IV:

Structured Query Language: Introduction, History of SQL Standards, Commands in SQL, Data types in SQL, Data Definition Language (DDL),Selection Operation Projection Operation, Aggregate Functions, Data Manipulation Language, Table Modification, Table Truncation, Imposition of Constraints, Set Operations.

UN IT V:

PL/SQL: Introduction, Structure of PL/SQL,PL/SQL Language Elements, Data Types, Control Structure, Steps to Create a PL/SQL Program, Iterative Control Cursors, Steps to Create a Cursor, Procedure, Functions, Packages, Exceptions Handling, Database Triggers, Types of triggers.

SRI DNR GDC(W) PALAKOL

B.A / B.Sc
MATHEMATICS

2. DETAILS OF PAPER TITLES & CREDITS

Sem	Course no.	Course Name	Course type (T/L/P)	Hrs./ Week (Arts/ Commeerc 4+2 and Science: 4+2)	Credits (Arts/ Commee rce: 4+1 & Science: 4+1)	Max. Marks Cont/ Internal/ Mid Assessme nt	Max. Marks Sem-end Exam
I	I	Differential Equations	T and P	6	5	25	75
II	II	Three dimensional Analytical Solid Geometry	T and P	6	5	25	75
III	III	Abstract Algebra	T and P	6	5	25	75
IV	IV	Real Analysis	T and P	6	5	25	75
	V	Linear Algenra	T and P	6	5	25	75
V	-	-	-	-	-	-	
	-	-	-	-	-	-	

Note: *Course type code: T: Theory, L: Lab, P: Problemsolving

SRI DNR GDC(W) PALAKOL

B.A/ B.Sc	Semester-I	Credits:4
Course:1	DIFFERENTIAL EQUATIONS	Hrs/Weak:5

Course Outcomes:

After successful completion of this course, the student will be able to;

- Solve linear differential equations
- Convert non exact homogeneous equations to exact differential equations by using integrating factors
- Know the methods of finding solutions of differential equations of the first order but not of the first Degree.
- Solve higher-order linear differential equations, both homogeneous and non homogeneous, with constant coefficients.
- Understand the concept and apply appropriate methods for solving differential equations.

UNIT I: (12 Hours)

Differential Equations of first order and first degree:

Linear Differential Equations; Differential equations reducible to linear form; Exact differential equations; Integrating factors.

UNIT II: (12 Hours)

Differential Equations of first order but not of the first degree:

Equations solvable for p; Equations solvable for y; Equations solvable for x; Equations homogeneous in x and y; Equations of the first degree in x and y – Clairaut's Equation.

UNIT III: (12 Hours)

Higher order linear differential equations-I:

Solution of homogeneous linear differential equations of order n with constant coefficients; Solution of the non-homogeneous linear differential equations with constant coefficients by means of polynomial operators. General Solution of f(D)y=0.

General Solution of f(D)y=Q when Q is a function 1/f(D) is expressed as partial fractions of x,

P.I. of f(D)y = Q when Q= be^{ax}

P.I. of f(D)y = Q when Q is bsin ax or b cos ax.

UNIT IV: (12 Hours)

Higher order linear differential equations-II:

Solution of the non-homogeneous linear differential equations with constant coefficients.

P.I. of f(D)y = Q when Q= bx^k

P.I. of f(D)y = Q when Q= e^{ax} V **,** where V is a function of x.

of f(D)y = Q when Q= xV **,** where V is a function of x.

of f(D)y = Q when Q= x^mV **,** where V is a function of x.

UNIT V: (12 Hours)

Higher order linear differential equations-III :

Method of variation of parameters; Linear differential Equations with non-constant coefficients(Solution when a part of CF is known method only); The Cauchy-Euler Equation, Legendre's linear equations.

Co-Curricular Activities(15 Hours)

Seminar/ Quiz/ Assignments/ Applications of Differential Equations to Real life Problem /Problem Solving.

SRI DNR GDC(W) PALAKOL

B.A/ B.Sc	Semester-II	Credits:4
Course:2	THREE DIMENSIONAL ANALYTICAL SOLID GEOMETRY	Hrs/Weak:5

Course Outcomes:

After successful completion of this course, the student will be able to;

1. get the knowledge of planes.
2. basic idea of lines, sphere and cones.
3. understand the properties of planes, lines, spheres and cones.
4. express the problems geometrically and then to get the solution.

UNIT I: (12hrrs)

The Plane: Equation of plane in terms of its intercepts on the axis, Equations of the plane through the given points, Length of the perpendicular from a given point to a given plane, Bisectors of angles between two planes, Combined equation of two planes, Orthogonal projection on a plane.

UNIT II: (12 hrs)

The Line :Equation of a line; Angle between a line and a plane; The condition that a given line may lie in a given plane; The condition that two given lines are coplanar; Number of arbitrary constants in the equations of straight line; Sets of conditions which determine a line; The shortest distance between two lines; The length and equations of the line of shortest distance between two straight lines; Length of the perpendicular from a given point to a given line.

UNIT III: (12 hrs)

The Sphere :Definition and equation of the sphere; Equation of the sphere through four given points; Plane sections of a sphere; Intersection of two spheres; Equation of a circle; Sphere through a given circle; Intersection of a sphere and a line; Power of a point; Tangent plane; Plane of contact; Polar plane; Pole of a Plane; Conjugate points; Conjugate planes;

UNIT IV: (12 hrs)

The Sphere and Cones : Angle of intersection of two spheres; Conditions for two spheres to be orthogonal; Radical plane; Coaxial system of spheres. Limiting Points.

Definitions of a cone; vertex; guiding curve; generators; Equation of the cone with a given vertex and guiding curve; equations of cones with vertex at origin are homogenous; Condition that the general equation of the second degree should represent a cone;

UNIT V: **(**12 hrs)

Cones :Enveloping cone of a sphere; right circular cone: equation of the right circular cone with a given vertex, axis and semi vertical angle: Condition that a cone may have three mutually perpendicular generators; intersection of a line and a quadric cone; Tangent lines and tangent plane at a point; Condition that a plane may touch a cone; Reciprocal cones; Intersection of two cones with a common vertex.

Co-Curricular Activities 15 Hours)

Seminar/ Quiz/ Assignments/Three dimensional analytical Solid geometry and its applications/ Problem

Solving.

B.A/ B.Sc	Semester-III	Credits:4
Course:3	ABSTRACT ALGEBRA	Hrs/Weak:5

Course Outcomes:

After successful completion of this course, the student will be able to;

- acquire the basic knowledge and structure of groups, subgroups and cyclic groups.
- get the significance of the notation of a normal subgroups.
- get the behavior of permutations and operations on them.
- study the homomorphisms and isomorphisms with applications.
- Understand the ring theory concepts with the help of knowledge in group theory and to prove thetheorems.
- Understand the applications of ring theory in various fields.

UNIT I: (12 Hours)

GROUPS : Binary Operation – Algebraic structure – semi group-monoid – Group definition and elementary properties Finite and Infinite groups – examples – order of a group, Composition tables with examples.

UNIT II: (12 Hours)

SUBGROUP: Complex Definition – Multiplication of two complexes Inverse of a complex-Subgroup definition- examples-criterion for a complex to be a subgroups. Criterion for the product of two subgroups to be a subgroup-union and Intersection of subgroups. **Co-sets and Lagrange's Theorem:** Cosets Definition – properties of Cosets–Index of a subgroups of a finite groups–Lagrange's Theorem.

UNIT III: (12 Hours)

NORMAL SUBGROUPS: Definition of normal subgroup – proper and improper normal subgroup– Hamilton group – criterion for a subgroup to be a normal subgroup – intersection of two normal subgroups – Sub group of index 2 is a normal sub group –quotient group – criteria for the existence of a quotient group.

UNIT IV: (12 Hours)

HOMOMORPHISM : Definition of homomorphism – Image of homomorphism elementary propertiesof homomorphism – Isomorphism – automorphism definitions and elementary properties– kernel of a homomorphism – fundamental theorem on Homomorphism and applications.

PERMUTATIONS: Definition of permutation – permutation multiplication – Inverse of a permutation –cyclic permutations – transposition – even and odd permutations – Cayley's theorem.

UNIT V: (12 Hours)

RINGSDefinition of Ring and basic properties, Boolean Rings, divisors of zero and cancellation laws Rings,

Integral Domains, Division Ring and Fields, The characteristic of a ring - The characteristic of an Integral Domain, The characteristic of a Field. Sub Rings.

B.A/ B.Sc	Semester-IV	Credits:4
Course:4	MATHEMATICS REAL ANALYSIS	Hrs/Weak:5

Course Outcomes:

After successful completion of this course, the student will be able to

- get clear idea about the real numbers and real valued functions.
- obtain the skills of analyzing the concepts and applying appropriate methods for testing convergence of a sequence/ series.
- Test the continuity and differentiability and Riemann integration of a function.
- Know the geometrical interpretation of mean value theorems.

UNIT I: (12 Hours)

Introduction of Real Numbers (No question is to be set from this portion)

Real Sequences: Sequences and their limits, Range and Boundedness of Sequences, Limit of a sequence and Convergent sequence. The Cauchy's criterion, properly divergent sequences, Monotone sequences, Necessary and Sufficient condition for Convergence of Monotone Sequence, Limit Point of Sequence, Subsequences , Cauchy Sequences – Cauchy's general principle of convergence theorem.

UNIT II: (12 Hours)

INFINITIE SERIES :

Series : Introduction to series, convergence of series. Cauchy's general principle of convergence for series tests for convergence of series, Series of Non-Negative Terms.

1. P-test
2. Cauchy's n^{th} root test or Root Test.
3. D'-Alemberts' Test or Ratio Test.
4. Alternating Series – Leibnitz Test.

UNIT III: (12 Hours)

CONTINUITY:

Limits: Real valued Functions, Boundedness of a function, Limits of functions. Some extension of the limit

concept, Infinite Limits. Limits at infinity. (No question is to be set from this portion).
Continuous functions: Continuous functions, Combinations of continuous functions, Continuous Functions on interval.

UNIT IV: **(12 Hours)**
DIFFERENTIATION AND MEAN VALUE THEOREMS: The derivability of a function, on an interval, at a point, Derivability and continuity of a function, Graphical meaning of the Derivative, Mean valueTheorems; Rolle's Theorem, Lagrange's Theorem, Cauchy's Mean value Theorem
UNIT V: **(12 Hours)**
RIEMANN INTEGRATION : Riemann Integral, Riemann integral functions, Darboux theorem. Necessary and sufficient condition for R – integrability, Properties of integrable functions, Fundamental theorem of integral calculus, First mean value Theorem.

B.A/ B.Sc	Semester-IV	Credits:4
Course:5	LINEAR ALGEBRA	Hrs/Weak:5

Course Outcomes:
After successful completion of this course, the student will be able to;

- understand the concepts of vector spaces, subspaces, basises, dimension and their properties.
- understand the concepts of linear transformations and their properties
- apply Cayley- Hamilton theorem to problems for finding the inverse of a matrix and higher powers of matrices without using routine methods
- Learn the properties of inner product spaces and determine orthogonality in inner product spaces.

UNIT I: (12 Hours)
Vector Spaces-I: Vector Spaces, General properties of vector spaces, n-dimensional Vectors, addition and scalar multiplication of Vectors, internal and external composition, Null space, Vector subspaces, Algebra of subspaces, Linear Sum of two subspaces, linear combination of Vectors, Linear span Linear independence and Linear dependence of Vectors.

UNIT II: **(12 Hours)**
Vector Spaces-II: Basis of Vector space, Finite dimensional Vector spaces, basis extension, co-ordinates, Dimension of a Vector space, Dimension of a subspace, Quotient space and Dimension of Quotient space.

UNIT III: (12 Hours)
Linear Transformations: Linear transformations, linear operators, Properties of L.T, sum and product of LTs, Range and null space of linear transformation, Rank and Nullity of linear transformations – Rank
– Nullity Theorem.

UNIT IV: (12 Hours)

Matrix : Linear Equations, Characteristic equations, Characteristic Values & Vectors of square matrix,Cayley – Hamilton Theorem.

UNIT V: (12 Hours)

Inner product space : Inner product spaces, Euclidean and unitary spaces, Norm or length of a Vector, Schwartz inequality, Triangle Inequality, Parallelogram law, Orthogonality, Orthonormal set, Gram– Schmidt orthogonalisation process. Bessel's inequality and Parseval's Identity.

B.Sc
PHYSICS

2. DETAILS OF COURSE TITLES & CREDITS

Sem	Course no.	Course Name	Course type (T/L/P)	Hrs./Week (Science: 4+2)	Credits (Science: 4+1)	Max. Marks Cont/ Internal/Mid Assessment	Max. Marks Sem-end Exam
I	1	Mechanics, Waves & Oscillations	T	4	4	25M	75M
	2	Practila course -1	L	2	1	0	50M
II	3	Wave Optics	T	4	4	25M	75M
	4	Practial Course - 2	L	2	1	0	50M
III	5	Heat & Thermodynamic	T	4	4	25M	50M
	6	Practial Course - 3	L	2	1	0	50M

IV IV	7	Electricity, Magnetism & Electronics	T	4	4	25M	50M
	8	Practical Course - 4	L	2	1	0	50M
	9	Modern Physics	T	4	4	25M	50M
	10	Practical Course - 5	L	2	1	0	25M

Note: *Course type code: T: Theory, L: Lab, P: Problem solving

BSc	Semester: I	Credits: 4
Course: 1	Mechanics, Waves and Oscillations	Hrs/Wk: 4

Learning outcomes:

- To understand basic theories related with properties of matter and its applications to determine values of various physical quantities associated with matter.
- Be able to apply knowledge of the properties of matter to explain natural physical processes and related technological advances.
- To learn about fundamentals of verbal and mathematical concepts of waves and oscillations
- We should make the students to know their skills required to get the information from the syllabus and use them in a proper way

UNIT I:

Mechanics of Particles: Review of Newton's Laws of Motion, Motion of variable mass system, Motion of a rocket, Multistage rocket, Concept of impact parameter, scattering cross-section, Rutherford scattering-Derivation.

Mechanics of Rigid bodies: Rigid body, rotational kinematic relations, Equation of motion for a rotating body, Angular momentum and Moment of inertia tensor, Euler equations, Precession of a spinning top, Gyroscope, Precession of the equinoxes

UNIT II:

Motion in a Central Force Field: Central forces, definition and examples, characteristics of central forces, conservative nature of central forces, Equation of motion under a central force, Kepler's laws of planetary motion- Proofs, Motion of satellites, Basic idea of Global Positioning System (GPS), weightlessness, Physiological effects of astronauts

UNIT III:

Relativistic Mechanics: Introduction to relativity, Frames of reference, Galilean transformations, absolute frames, Michelson-Morley experiment, negative result, Postulates of Special theory of relativity,Lorentz transformation, time dilation, length contraction, variation of mass with velocity, Einstein's mass-energy relation.

UNIT IV:

Undamped, Damped and Forced oscillations: Simple harmonic oscillator and solution of the differential equation, Damped harmonicoscillator, Forced harmonic oscillator – Their differential equations and solutions, Resonance,Logarithmic decrement, Relaxation time and Quality factor.

Coupled oscillations: Coupled oscillators - introduction , Two coupled oscillators, Normal coordinates and Normal Modes.

UNIT V:

Vibrating Strings: 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 andHarmonics.

Ultrasonic's: Ultrasonics, General Properties of ultrasonic waves, Production of ultrasonics by piezoelectric and magnetostriction methods, Detection of ultrasonics, Applications of ultrasonic waves, SONAR

B Sc	Semester: 2	Credits: 4
Course: 2	Wave Optics	Hrs/Wk: 4

Student able to Learning:

- Understand the nature of light and principles of Laser and holography.
- Analyse the intensity variation of light due to interference, diffraction andpolarization.
- Solve problems in Optics by selecting theappropriate equations and performing numerical or analytical calculations.
- Student can able to operation of optical devices including polarizers, interferometers,and Lasers.

UNIT I: Interference of light: (12hrs)

Introduction, Conditions for interference of light, Interference of light by division of wave front and amplitude,Phase change on reflection- Stokes' treatment, Lloyd's single mirror, Interference in thin films: Plane parallel and wedge- shaped films, colours in thin films, Newton's rings in reflected

light-Theory and experiment, Determination of wavelength of monochromatic light, Michelson interferometer anddetermination of wavelength.

UNIT II: Diffraction of light:(12hrs)

Introduction, Types of diffraction: Fresnel and Fraunhoffer diffractions, Distinction between Fresnel and Fraunhoffer diffraction,Fraunhoffer diffraction at a single slit, Plane diffraction grating,Determination of wavelength of light using diffraction grating, Resolving power of grating, Fresnel's half period zones, Explanation of rectilinear propagation of light, Zone plate, comparison of zone plate with convex lens.

UNIT III: Polarisation of light:(12hrs)

Polarized light: Methods of production of plane polarized light, Double refraction, Brewster's law, Malus law, Nicol prism, Nicol prism as polarizer and analyzer, Quarter wave plate, Half wave plate, Plane, Circularly and Elliptically polarized light-Production and detection, Optical activity, Laurent's half shade polarimeter: determination of specific rotation.

UNIT IV: Aberrations and Fibre Optics: (12hrs)

Monochromatic aberrations, Spherical aberration, Methods of minimizing spherical aberration, Coma, Astigmatism and Curvature of field, Distortion; Chromatic aberration-the achromatic doublet; Achromatism for two lenses (i) in contact and (ii) separated by a distance. **Fibre optics:** Introduction to Fibers, different types of fibers, rays and modes in an optical fiber, Principles of fiber communication (qualitative treatment only), Advantages of fiber optic communication.

UNIT V: Lasers and Holography:(12hrs)

Lasers: Introduction, Spontaneous emission, stimulated emission, Population Inversion, Laser principle, Einstein coefficients, Types of lasers-He-Ne laser, Ruby laser, Applications of lasers; Holography: Basic principle of holography, Applications of holography

B Sc	Semester: 3	Credits: 4
Course: 3	Heat and thermodynamics	Hrs/Wk: 4

Student able to Learning:

- Students will be able to Perform experiments and interpret the results of observation, including making an assessment of experimental uncertainties.
- They develop the ability to apply the knowledge acquired in the classroom and laboratories to specific problems in theoretical and experimental Physics.
- To apply the theories learnt and the skills acquired to solve real time problems
- To understand the concepts and significance of the various physical phenomena

UNIT I: Kinetic Theory of gases: (12 hrs)

Kinetic Theory of gases-Introduction, Maxwell's law of distribution of molecular velocities (qualitative treatment only) and its experimental verification,Mean free path, Degrees of freedom, Principle of equipartition of energy (Qualitative ideas only), Transport phenomenon in ideal gases: viscosity, Thermal conductivity and diffusion of gases.

UNIT II: Thermodynamics: (12hrs)

Introduction- Isothermal and Adiabatic processes, Reversible and irreversible processes, Carnot's engine and its efficiency, Carnot's theorem, Thermodynamic scale of temperature and its identity with perfect gas scale, Second law of thermodynamics: Kelvin's and Clausius statements, Principle of refrigeration, Entropy, Physical significance, Change in entropy in reversible and irreversible processes; Entropy and disorder-Entropy of Universe; Temperature-Entropy (T-S) diagram and its uses ; change of entropy when ice changes into steam.

UNIT III: Thermodynamic Potentials and Maxwell's equations: (12hrs)

Thermodynamic potentials-Internal Energy, Enthalpy, Helmholtz Free Energy, Gibb's Free Energy and their significance, Derivation of Maxwell's thermodynamic relations from thermodynamic potentials, Applications to (i) Clausius-Clayperon's equation (ii) Value of C_P-C_V (iii) Value of C_P/C_V (iv) Joule-Kelvin coefficient for ideal gases.

UNIT IV: Low temperature Physics:(12hrs) Methods for producing very low temperatures, Joule Kelvin effect, Porous plug experiment , Joule expansion, Distinction between adiabatic and Joule Thomson expansion, Expression for Joule Thomson cooling, Liquefaction of air by Linde's method, Production of low temperatures by adiabatic demagnetization (qualitative), Practical applications of substancesat low temperatures.

UNIT V: Quantum theory of radiation: (12 hrs) Blackbody and its spectral energy distribution of black body radiation, Kirchoff's law, Wein'sdisplacement law, Stefan-Boltzmann's law and Rayleigh-Jean's law (Noderivations), Planck's law of black body radiation-Derivation, Deduction of Wein's law and Rayleigh-Jean's law from Planck's law, Solar constant and its determination using Angstrompyroheliometer, Estimation of surface temperature of Sun.

B Sc	Semester: 4	Credits: 4
Course: 4	Electricity, Magnetism & Electronics	Hrs/Wk: 4

Student Able learn:

- To learn about Gauss law and solve the electric field and magnetic field for various geometric objects and to learn basic electronic concepts in analog and digital theory.
- To be Explain all the topics of Experiments, Concepts and Derivations to the student
- Apply the principles of electronics in day to day life.

- Encourage all the students to study higher educational courses in reputed institutes and to enrich the students with creative, logical and analytical skills and to motivate the students towards research side

UNIT I:

Electrostatics: (6hrs) : Gauss's law-Statement and its proof, Electric field intensity due to (i) uniformly charged solid sphere and (ii) an infinite conducting sheet of charge, Deduction of Coulomb's law from Gauss law, Electrical potential–Equipotential surfaces, Potential due to a uniformly charged sphere.

Dielectrics: (6 hrs): Dielectrics-Polar and Non-polar dielectrics- Effect of electric field on dielectrics,Dielectric strength, Capacitance of a parallel plate condenser with dielectric slab between the plates, Electric displacement D, electric polarization P,Relation between D, E and P, Dielectric constant and electric susceptibility.

UNIT II:

Magnetostatics: (6 hrs): Biot-Savart's law and its applications: (i) circular loop and (ii) solenoid, Ampere's Circuital Law and its application to Solenoid, Hall effect, determination of Hall coefficient and applications.

Electromagnetic Induction: (6 hrs): Faraday's laws of electromagnetic induction, Lenz's law, Self induction and Mutual induction,Self inductance of a long solenoid, Mutual inductance of two coils, Energy stored in magnetic field, Eddy currents.

UNIT III:

Alternating currents: (6 hrs): Alternating current - Relation between current and voltage in L,C, R, LR and CR circuits, Phasor and Vector diagrams, LCR series and parallel resonant circuit, Q – factor, Power factor.

Electromagnetic waves-Maxwell's equations:(6 hrs) : Idea of displacement current,Maxwell's equations-Derivation, Maxwell's wave equation (with derivation), Transverse nature of electromagnetic waves, Poynting theorem (Statement andproof). Velocity of wave equation using maxwells relations in vaccume.

UNIT IV:

Basic Electronic devices: (12 hrs): PN junction diode, Zenerdiode andLight Emitting Diode (LED) and their I-V characteristics, Zener diode as a regulator- Transistors and its operation, CB, CE and CC configurations, Input and output characteristicsofa transistor in CE mode, Relation between alpha, beta and gamma; Transistor as an amplifier.

UNIT-V:

Digital Electronics: (12 hrs): Number systems, Conversion of binary to decimal system and vice versa, Binary addition & Binary subtraction (1's and 2's complement methods), Laws of Boolean algebra, DeMorgan's laws-Statements and Proofs, Basic logic gates, NAND and NOR as universal gates, Exclusive-OR gate, Half adder and Full adder circuits.

B Sc	Semester: 4	Credits: 4
Course: 5	Modern Physics	Hrs/Wk: 4

Student able learn:

- To Create awareness on the topics of Atomic & Molecular Physics, Quantum mechanics, Nuclear Physics, and Solid state physics.
- To be Explain all the topics of Experiments, Concepts and Derivations to the student.
- Explain the basic principles of quantum mechanics and apply to Atomic, Molecular structure of energy levels etc..
- Motivate all the students to pursue PG courses in reputed institutes and to endow the students with creative and analytical skills; this will equip them to become entrepreneurs.

UNIT I :

Atomic and Molecular Physics:(12 hrs): Vector atom model and Stern-Gerlach experiment,Quantum numbers associated with it,Angular momentum of the atom, Coupling schemes, Spectral terms and spectral notations, Selection rules, Intensity rules, Fine structure of Sodium D-lines, Zeeman effect, Experimentalarrangement to study Zeeman effect; Raman effect, Characteristics of Raman effect. Experimental arrangement to study Raman effect, Quantum theory of Raman effect, Applications of Raman effect.

UNIT II:

Matter waves &Uncertainty Principle:(12 hrs): Matter waves, de Broglie's hypothesis, Wave length of matter waves, Properties of matter waves, Davisson and Germer's experiment, Phase and group velocities, Heisenberg's uncertainty principle for position and momentum& energy and time, Illustration of uncertainty principle using diffraction of beam of electrons and photons (Gamma ray microscope),Bohr's principle of complementarity.

UNIT III:

Quantum (Wave) Mechanics:(12 hrs): Basic postulates of quantum mechanics, Schrodinger time independent and time dependent wave equations-Derivations, Physical interpretation of wave function, Eigen functions, Eigen values, Application of Schrodinger wave equation to (i) one dimensional potential box of infinite height(InfinitePotential Well) and (ii) three dimensional box - tunneling effect.

UNIT IV:

Nuclear Physics:(12 hrs): *Nuclear Structure*: General Properties of Nuclei, Mass defect, Binding energy; *Nuclear forces*:Characteristics of nuclear forces- Yukawa's meson theory; *Nuclear Models*: Liquid drop model, The Shell model, Magic numbers; *Nuclear Radiation detectors*: G.M. Counter, Cloud chamber, Solid State detector; *Elementary Particles*: Elementary Particles and their classification.

UNIT-V:

Nano materials:(7hrs): Nanomaterials – Introduction, Electron confinement, Size effect, Surface to volume ratio, Classification of nano materials– (0D, 1D, 2D); Quantum dots, Nano wires, Fullerene, CNT, Graphene(Mention of structures and properties),Distinct properties of nano materials (Mention-*mechanical,optical, electrical, and magnetic properties*); Mention of applications of nano materials: (*Fuel cells,Phosphors for HD TV).*

Superconductivity: (5 hrs): Introduction to Superconductivity, Experimental results-critical temperature, critical magnetic field, Meissner effect , Isotope effect,Type I and Type II superconductors, BCS theory (elementary ideas only),Applications of superconductors

B.Sc
CHEMISTRY

STRUCTURE OF CHEMISTRY CORE SYLLABUS

Sem	Course No	Course Name	Course Type (T/P/L)	Hrs/Week	Credits	Max. Marks	Max. Marks
				Science: 4+2	Science: 4+1	Count/Internal/ Mid Assessment	Sem- End Exam
I	1	Inorganic and Physical Chemistry	T	4	4	25	75
	2	Practical – I Analysis of SALT MIXTURE	L	2	1	-	50
II	3	Organic and General Chemistry	T	4	4	25	75
	4	Practical – II Volumetric Analysis	L	2	1	-	50
III	5	Organic Chemistry and Spectroscopy	T	4	4	25	75
	6	Practical – III Organic preparations and IR Spectral Analysis	L	2	1	-	50
IV	7	Inorganic, Organic and Physical Chemistry	T	4	4	25	75
	8	Practical – IV Organic Qualitative analysis	L	2	1	-	50
	9	Inorganic and Physical Chemistry	T	4	4	25	75
	10	Practical-V Course Conductometric and Potentiometric Titrimetry	L	2	1	-	50

B.Sc.	Semester - I	Credits: 4
Course: 1	Inorganic and Physical Chemistry	Hrs/Wk: 4

Course outcomes:

At the end of the course, the student will be able to;

- Understand the basic concepts of p-block elements
- Explain the difference between solid, liquid and gases in terms of intermolecular interactions.
- Apply the concepts of gas equations, pH and electrolytes while studying other chemistry courses.

UNIT I:

INORGANIC CHEMISTRY :Chemistry of p-block elements

Group 13: Preparation & structure of Diborane, Borazine

Group 14: Preparation, classification and uses of silicones

Group 15: Preparation & structures of Phosphonitrilic halides $\{(PNCl_2)_n$ where n=3, 4

Group 16: Oxides and Oxoacids of Sulphur (structures only)

Group 17: Pseudohalogens, Structures of Interhalogen compounds.

UNIT II:

1. Chemistry of d-block elements:

Characteristics of d-block elements with special reference to electronic configuration, variable valence, magnetic properties, catalytic properties and ability to form complexes. Stability of various oxidation states.

2. Chemistry of f-block elements:

Chemistry of lanthanides - electronic structure, oxidation states, lanthanide contraction, consequences of lanthanide contraction, magnetic properties. Chemistry of actinides - electronic configuration, oxidation states, actinide contraction, comparison of lanthanides and actinides.

3. Theories of bonding in metals:

Valence bond theory and Free electron theory, explanation of thermal and electrical conductivity of metals based on these theories, Band theory- formation of bands, explanation of conductors, semiconductors and insulators.

UNIT III: PHYSICAL CHEMISTRY

Solid state

Symmetry in crystals. Law of constancy of interfacial angles. The law of rationality of indices. The law of symmetry. Miller indices, Definition of lattice point, space lattice, unit cell. Bravais lattices and crystal systems. X-ray diffraction and crystal structure. Bragg's law. Powder method. Defects in crystals. Stoichiometric and non-stoichiometric defects.

UNIT IV:

1. Gaseous state

van der Waal's equation of state. Andrew's isotherms of carbon dioxide, continuity of state. Critical phenomena. Relationship between critical constants and vander Waal's constants. Lawof corresponding states. Joule- Thomson effect. Inversion temperature.

2.Liquid state

Liquid crystals, mesomorphic state. Differences between liquid crystal and solid/liquid. Classification of liquid crystals into Smectic and Nematic. Application of liquid crystals as LCD devices.

UNIT V:SOLUTIONS, IONIC EQUILIBRIUM & DILUTE SOLUTIONS

1. Solutions

Azeotropes- HCl-H_2O system and ethanol-water system. Partially miscible liquids-phenol- water system. Critical solution temperature (CST), Effect of impurity on consulate temperature. Immiscible liquids and steam distillation. Nernst distribution law. Calculation of the partition coefficient. Applications of distribution law.

2. Ionic equilibrium

Ionic product, common ion effect, solubility and solubility product. Calculations based on solubility product.

3. Dilute solutions

Colligative properties- RLVP, Osmotic pressure, Elevation in boing point and depression in freezing point. Experimental methods for the determination of molar mass of a non-volatile solute using osmotic pressure, Elevation in boiling point and depression in freezing point. Abnormal colligative properties. Van't Hoff factor.

B.Sc.	Semester - II	Credits: 4
Course: 2	Organic & General Chemistry	Hrs/Wk: 4

Course outcomes:

At the end of the course, the student will be able to;

- Understand and explain the differential behavior of organic compounds based on fundamental concepts learnt.
- Formulate the mechanism of organic reactions by recalling and correlating the fundamental properties of the reactants involved
- Learn and identify many organic reaction mechanism including Free Radical Substitution, Electrophonic Addition and Electrophonic Aromatic Substitution.
- Correlateanddescribethestereochemicalpropertiesoforganiccompoundsand reactions.

UNIT I: ORGANIC CHEMISTRY

Recapitulation of Basics of Organic Chemistry

Carbon-Carbon sigma bonds (Alkanes and Cycloalkanes)

General methods of preparation of alkanes- Wurtz and Wurtz-Fittig reaction, Corey House synthesis, physical and chemical properties of alkanes, Isomerism and its effect on properties, Free radical substitutions; Halogenations, concept of relative reactivity v/s selectivity. Conformational analysis of alkanes (Conformations, relative stability and energy diagrams of Ethane, Propane and butane) General molecular formulae of cycloalkanes and relative stability, Baeyer strain theory, Cyclohexane conformations with energy diagram, Conformations of monosubstituted cyclohexane.

UNIT II: Carbon-Carbon pi Bonds(Alkenes and Alkynes)

General methods of preparation, physical and chemical properties. Mechanism of E1, E2, E1 cb reactions, Saytzeff and Hofmann eliminations, Electrophilic Additions ,mechanism (Markovnikov/Anti Markovnikov addition) with suitable examples,, *syn and anti-addition*; additionofH_2,X_2, HX. Oxymercuration, demercuration, hydroboration-oxidation, ozonolysis, hydroxylation, Diels Alderreaction,1,2- and1,4-addition reactions in conjugated dienes. Reactions of alkynes; acidity, electrophilic and nucleophilic additions, hydration to form carbonyl compounds,

Alkylation of terminal alkynes.

UNIT III: Benzene and its reactivity

Concept of aromaticity, Huckel's rule - application to Benzenoid (Benzene, Naphthalene) and Non - Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation) Reactions - General mechanism of electrophilic aromatic substitution, mechanism of nitration, Friedel- Craft's alkylation and acylation. Orientation of aromatic substitution - ortho, para and meta directing groups. Ring activating and deactivating groups with examples (Electronic interpretation of various groups like NO_2 and Phenolic).

Orientation of

i. Amino, methoxy and methyl groups
ii. Carboxy, nitro, nitrile, carbonyl and sulfonic acid groups
iii. Halogens (Explanation by taking minimum of one example from each type)

UNIT IV: GENERAL CHEMISTRY

1. Surface chemistry and chemical bonding Surface chemistry

Colloids- Coagulation of colloids- Hardy-Schulze rule. Stability of colloids, Protection of Colloids, Gold number.

Adsorption-Physical and chemical adsorption, Langmuir adsorption isotherm, applications of adsorption.

1. Chemical Bonding

Valence bond theory, hybridization, VB theory as applied to ClF3**,**Ni(CO**)4,** Molecular orbital theory -LCAO method, construction of M.O. diagrams for homo-nuclear and hetero-nuclear diatomic molecules(N2,O2,CO and NO).

2. HSAB

Pearson's concept, HSAB principle & its importance, bonding in Hard-Hard and Soft-Soft combinations.

UNIT V:

Stereochemistry of carbon compounds

Molecular representations- Wedge, Fischer, Newman and Saw-Horse formulae. **Optical isomerism**: Optical activity- wave nature of light, plane polarised light, optical rotation and specific rotation. Chiral molecules- definition and criteria (Symmetry elements)- Definition of enantiomers and diastereomers – Explanation of optical isomerism with examples- Glyceraldehyde, Lactic acid, Alanine, Tartaric acid, 2,3-dibromopentane. D,L, R,S and E,Z- configuration with examples. Definition of Racemic mixture – Resolution of racemic mixtures (any 3 techniques)

Co-curricular activities and Assessment Methods Continuous Evaluation: Monitoring the progress of student's learning Class Tests, Worksheets and Quizzes Presentations, Projects and Assignments and Group Discussions: Enhances critical thinking skills and personality

Semester-end Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout the semester.

B.Sc.	Semester - III	Credits: 4
Course: 3	Organic chemistry & Spectroscopy	Hrs/Wk: 4

Course outcomes:

At the end of the course, the student will be able to;

- Understand preparation, properties and reactions of haloalkanes, haloarenes and oxygen containing functional groups.
- Use the synthetic chemistry learnt in this course to do functional group transformations.
- To propose plausible mechanisms for any relevant reaction

UNIT I: ORGANIC CHEMISTRY

Chemistry of Halogenated Hydrocarbons: Alkyl Halides: Methods of preparation and properties, nucleophilic substitution reactions– SN1, SN2 and SNi mechanisms with stereo chemical aspects and effect of solvent etc.; nucleophilic substitution vs. elimination, Williamson's synthesis. Aryl Halides: Preparation (including preparation from diazonium salts) and properties, nucleophilic aromatic substitution; SN Ar, Benzyne mechanism. Relative reactivity of alkyl, allyl, benzyl, vinyl and aryl halides towards nucleophilic substitution reactions.

1. Alcohols & Phenols

Alcohols: preparation, properties and relative reactivity of 1°, 2°, 3° alcohols, Bouvet Blanc Reduction; Oxidation Of Diols By Periodic Acid Andlead Tetraacetate,Pinacol- Pinacolone Rearrangement;

Phenols: Preparation And Properties; Acidity And Factors Affecting It, Ring substitution reactions, Reimer–Tiemann and Kolbe's–Schmidt Reactions, Fries and Claisen Rearrangement with mechanism;

UNIT II:

Carbonyl Compounds: Structure, reactivity, preparation and properties; Nucleophilic Addition, Nucleophilic Addition-elimination reactions with ammonia derivatives Mechanisms of Aldol and Benzoin Condensation, Claisan-Schmidt, Perkin, Cannizzaro and Wittig reaction, Beckmann Haloform Reaction And Baeyer Villiger oxidation, α- substitution reactions, oxidations and reductions (Clemmensen, wolf –kishner, with $LiAlH_4$ &$NaBH_4$). Addition Reactions Of α, β-unsaturated carbonyl compounds: Michael Addition. Active Methylene Compounds: Keto-enol tautomerism. Preparation And Synthetic Applications Diethyl malonate and ethyl acetoacetate.

UNIT III:

Carboxylic Acids and their Derivatives : General methods of preparation, physical properties and reactions of monocarboxylic acids, effect ofsubstituent acidic strength. Typical reactions of icarboxylic acids, hydroxy acids and unsaturated acids. Preparation And Reactions Of Acid Chlorides, anhydrides, esters and amides; Comparative study of nucleophilic substitution at acyl group-Mechanism of acidic and alkaline hydrolysis of esters, Claisen Condensation, Reformatsky reactions and Curtius Rearrangement Reactions involving H, OH and COOH groups- salt formation, anhydride formation, acid chloride formation, amide formation and esterification (mechanism). Degradation of carboxylic acids by Huns-Diecker reaction, decarboxylation by Schimdt reaction, Arndt- Eistert synthesis, halogenation by Hell- Volhard- Zelinsky reaction.

UNIT IV: SPECTROSCOPY

Molecular Spectroscopy:Interactionofelectromagneticradiationwithmoleculesandvarioustypesof spectra;

Rotation spectroscopy: Selection rules, intensities of spectral lines, determination of bond lengths of diatomic and linear triatomic molecules, isotopic substitution.

Vibrational Spectroscopy: Classical Equation Of Vibration, computation of force constant, Harmonic and anharmonic oscillator, Morse Potential curve, vibrational degrees of freedom for polyatomic molecules, modes of vibration. Selection rules for vibrational transitions, Fundamental Frequencies, overtones and hot bands.

Electronic spectroscopy: Energy levels of molecular orbitals (σ, π, n). Selection rules for electronic spectra. Types of electronic transitions in molecules, effect of conjugation. Concept of chromophore. bathochromic and hypsochromic shifts. Beer-Lambert's law and its limitations.

Nuclear Magnetic Resonance (NMR) spectroscopy: Principles of nuclear magnetic resonance, equivalent and non-equivalent protons, position of signals. Chemical shift, NMR splitting of signals - spin-spin coupling, coupling constants. Applications of NMR with suitable examples - ethyl bromide, ethanol, acetaldehyde, 1,1,2-tribromo ethane, ethyl acetate, toluene and acetophenone.

UNIT V: Application of Spectroscopy to Simple Organic Molecules

Application of visible, ultraviolet and Infrared spectroscopy in organic molecules. Application of electronic spectroscopy and Woodward rules for calculating λ_{max} of conjugated dienes and α,β – unsaturated compounds.

Infrared radiation and types of molecular vibrations, functional group and fingerprint region. IR spectra of alkanes, alkenes and simple alcohols (inter and intramolecular hydrogen bonding), aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on >C=O stretching absorptions).

Co-curricular activities and Assessment Methods Continuous Evaluation: Monitoring The Progress Of student's learning Class Tests, Worksheets and Quizzes, Presentations, Projects and Assignments Group Discussions: Enhances Critical Thinking Skills And personality

Semester-end Examination: critical indicator of student's learning and teaching methods adopted by teachers throughout the semester.

B.Sc.	Semester - IV	Credits: 4
Course: 4	Inorganic, Organic and Physical Chemistry	Hrs/Wk: 4

Course outcomes:

At the end of the course, the student will be able to;

- To learn about the laws of absorption of light energy by molecules and subsequent photochemical reactions.
- To understand the concept of quantum efficiency and mechanisms of photochemicalreactions.

UNIT I:

Organ metallic Compounds: Definition and classification of organometallic compounds on the basis of bond type, Concept of hapticity of organic ligands. Metal Carbonyls:18electronrule, electron count of mononuclear, polynuclear and substituted metal carbonyls of 3d series. General methods of preparation of mono and binuclear carbonyls of 3d series. P-acceptor behaviour of carbon monoxide. Synergic effects (VB approach) - (MO diagram of CO can be referred to for synergic effect to IR frequencies).

UNIT II:

Carbohydrates: Occurrence, classification and their biological importance, Monosaccharides: Constitution and absolute configuration glucose and fructose, epimers and anomers, mutarotation, determination of ring size of glucose and fructose, Haworth Projection And Conformational Structures ;Interconversions of aldoses and ketoses; Kiliani-Fischer synthesis and Ruff degradation; Disaccharides– Elementary Treatment Of Maltose, lactose and sucrose. Polysaccharides–Elementary Treatment Of starch.

UNIT III:

Amino acids and proteins: Introduction: Definition of Amino acids, classification of Amino acids into alpha, beta, and gamma amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and neutral amino acids with examples. 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) Gabriel Phthalimide synthesis c) strecker's synthesis.

Physical properties: Zwitter ion structure - salt like character - solubility, melting points, amphoteric 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 and proteins.

Heterocyclic Compounds: Introduction and definition: Simple five membered ring compounds with one hetero atom Ex. Furan. Thiophene and pyrrole - Aromatic character – Preparation from 1, 4, - dicarbonyl compounds, Paul-Knorr synthesis. Properties: Acidic character of pyrrole - electrophilic substitution at 2 or 5 position, Halogenation, Nitration and Sulphonation under mild conditions - Diels Alder reaction in furan. Pyridine – Structure - Basicity - Aromaticity- Comparison with pyrrole- one method of preparation and properties - Reactivity towards Nucleophilic substitution reaction.

UNIT IV:

Nitrogen Containing Functional Groups: Preparation, properties and important reactions of nitro compounds, amines and diazonium salts.

1. Nitro hydrocarbons

Nomenclature and classification-nitro hydrocarbons, structure -Tautomerism of nitroalkanes leading to aci and keto form, Preparation of Nitroalkanes, reactivity -halogenation, reaction with HONO (Nitrous acid), Nef reaction and Mannich reaction leading to Micheal addition and reduction.

B.Sc.	Semester - IV	Credits: 4
Course: 5	Inorganic & Physical Chemistry	Hrs/Wk: 4

Course outcomes:

At the end of the course, the student will be able to;

- Understand concepts of boundary conditions and quantization, probability distribution, most probable values, uncertainty and expectation values
- Application Of Quantization To Spectroscopy.
- Various types of spectra and their use in structure determination.

UNIT I: INFORMATION CHEMISTRY

Coordinator Chemistry: IUPAC nomenclature of coordination compounds, Structural and stereoisomerism in complexes with coordination numbers 4 and 6. Valence Bond Theory (VBT): Inner and outer orbital complexes. Limitations of VBT, Crystal field effect, octahedral symmetry. Crystal field stabilization energy (CFSE), Crystal field effects for weak and strong fields. Tetrahedral symmetry, Factors affecting the magnitude of crystal field splitting energy, Spectrochemical series, Comparison of CFSE for Octahedral and Tetrahedral complexes, Tetragonal distortion of octahedral geometry, Jahn-Teller distortion, square planar coordination.

UNIT II:

1. Inorganic Reaction Mechanism:

Introduction to inorganic reaction mechanisms. Concept of reaction pathways, transition state, intermediate and activated complex. Labile and inert complexes, ligand substitution reactions -SN^1 and SN^2, Substitution reactions in square planar complexes, Trans-effect, theories of trans effect and its applications

2. Stability of metal complexes:

Thermodynamic stability and kinetic stability, factors affecting the stability of metal complexes, chelate effect, determination of composition of complex by Job's method and mole ratio method.

Bioinorganic Chemistry:

Metal ions present in biological systems, classification of elements according to their action in biological system. Geochemical effect on the distribution of metals, Sodium / K - pump, carbonic anhydrase and carboxypeptidase. Excess and deficiency of some trace metals. Toxicity of metal ions (Hg, Pb, Cd and As), reasons for toxicity, Use of chelating agents in medicine, Cis-platin as an anti-cancer drug. Iron and its application in bio-systems, Haemoglobin, Myoglobin. Storage and transfer of iron.

UNIT-III: PHYSICAL CHEMISTRY

1 .Phase rule: Concept of phase, components, degrees of freedom. Thermodynamic derivation of Gibbs phase rule. Phase diagram of one component system - water system, Study of Phase diagrams of Simple eutectic systems i) Pb-Ag system, desilverisation of lead ii) NaCl-Water system, Congruent and incongruent melting point- Definition and examples for systems having congruent and incongruent melting point , freezing mixtures.

UNIT IV:

Electrochemistry: Specific conductance, equivalent conductance and molar conductance- Definition and effect of dilution. Cell constant. Strong and weak electrolytes, Kohlrausch's law and its applications, Definition of transport number, determination of transport number by Hittorf's method. Debye-Huckel-Onsager's equation for strong electrolytes (elementary treatment only), Application of conductivity measurements- conduct metric titrations.Electrochemical Cells- Single electrode

potential, Types of electrodes with examples: Metal- metal ion, Gas electrode, Inert electrode, Redox electrode, Metal-metal insoluble salt- salt anion. Determination of EMF of a cell, Nernst equation, Applications of EMF measurements - Potentiometric titrations. Fuel cells- Basic concepts, examples and applications

UNIT V:

Chemical Kinetics :

The concept of reaction rates. Effect of temperature, pressure, catalyst and other factors on reaction rates. Order and molecularity of a reaction, Derivation of integrated rate equations for zero, first and second order reactions (both for equal and unequal concentrations of reactants). Half–life of a reaction. General methods for determination of order of a reaction. Concept of activation energy and its calculation from Arrhenius equation. Theories of Reaction Rates: Collision theory and Activated Complex theory of bimolecular reactions. Comparison of the two theories (qualitative treatment only).Enzyme catalysis- Specificity,factors affecting enzyme catalysis, Inhibitors and Lock & key model. Michaels- Menten equation- derivation, significance of Michaelis-Menten constant.

B.Sc.
Computer Science

TABLE OF CONTENTS

Note: BOS is to provide final soft copy in PDF and word formats and four copies of hard copies in bounded form to the office of Dean Academic affairs.

B Sc	Semester: I	Credits: 4
Course: 1	PROBLEM SOLVING IN C	Hrs/Wk: 4

Aim and objectives of Course:

Thiscourseaimstoprovideexposuretoproblem-solvingthroughprogramming.

It introduces the concepts of the C Programminglanguage.

Learning outcomes of Course:

Upon successful completion of the course, a student will be able to:

Understand the evolution and functionality of a DigitalComputer.

Apply logical skills to analyse a givenproblem

Develop an algorithm for solving a givenproblem.

Understand 'C' language constructs like Iterative statements, Arrayprocessing, Pointers.

Apply 'C' language constructs to the algorithms to write a 'C'languageprogram.

3. Detailed Syllabus: (Five units with each unit having 12 hours of class work)

UNIT I:

General Fundamentals: Introduction to computers: Block diagram of a computer, characteristics and limitations of computers, applications of computers, types of computers, computergenerations.

Introduction to Algorithms and Programming Languages: Algorithm – Key features of Algorithms, Flow Charts, Programming Languages – Generations of Programming Languages – Structured Programming Language- Design and Implementation of Correct, Efficient and Maintainable Programs.

UNITII:

Introduction to C: Introduction – Structure of C Program – Writing the first C Program – File used in C Program – Compiling and Executing C Programs – Using Comments – Keywords – Identifiers – Basic Data Types in C – Variables – Constants – I/O Statements in C- Operators in C- Programming Examples.

Decision Control and Looping Statements: Introduction to Decision Control Statements – Conditional Branching Statements – Iterative Statements – Nested Loops – Break and Continue Statement – Goto Statement

UNIT III:

Arrays: Introduction – Declaration of Arrays – Accessing elements of the Array – Storing Values in Array – Operations on Arrays – one dimensional, two dimensional and multi dimensional arrays, character handling and strings.

UNIT IV:

Functions: Introduction – using functions – Function declaration/ prototype – Functiondefinition – function call – return statement – Passing parameters – Scope of variables – Storage Classes – Recursive functions.

Structure, Union, and Enumerated Data Types: Introduction – Nested Structures – Arrays of Structures – Structures and Functions – Union – Arrays of Unions Variables – Unions inside Structures – Enumerated Data Types.

UNIT V:

Pointers: Understanding Computer Memory – Introduction to Pointers – declaring Pointer Variables

– Pointer Expressions and Pointer Arithmetic – Null Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays – Memory Allocation in C Programs – Memory Usage – Dynamic Memory Allocation – Drawbacks of Pointers

Files: Introduction to Files – Using Files in C – Reading Data from Files – Writing Data to Files – Detecting the End-of-file – Error Handling during File Operations – Accepting Command Line Arguments.

B Sc	Semester: II	Credits: 4
Course: 2	DATA STRUCTURES USING C	Hrs/Wk: 4

Aim and objectives of Course:

To introduce the fundamental concept of data structures and to emphasize the importance of various data structures in developing and implementing efficientalgorithms.

Learning outcomes of Course:

Upon successful completion of the course, a student will be able to:

Understand available Data Structures for data storage andprocessing.

Comprehend Data Structure and their real-time applications - Stack, Queue, Linked List, Trees and Graph

Choose a suitable Data Structures for anapplication

Develop ability to implement different Sorting and Searchmethods

Have knowledge on Data Structures basic operations like insert, delete, search, update andtraversal

Design and develop programs using various datastructures

Implement the applications of algorithms for sorting, pattern matchingetc Detailed Syllabus: (Five units with each unit having 12 hours of classwork)

UNITI:

Introduction to Data Structures: Introduction to the Theory of Data Structures, Data Representation, Abstract Data Types, Data Types, Primitive Data Types, Data Structure and Structured Type, Atomic Type, Difference between Abstract Data Types, Data Types, and Data Structures, Refinement Stages. Principles of Programming and Analysis of Algorithms: Software Engineering, Program Design, Algorithms, Different Approaches to Designing an Algorithm, Complexity, Big 'O' Notation, Algorithm Analysis, Structured Approach to Programming, Recursion, Tips and Techniques for Writing Programs in 'C'.

UNITII:

Arrays: Introduction to Linear and Non- Linear Data Structures, One- Dimensional Arrays, Array Operations, Two-Dimensional arrays, Multidimensional Arrays, Pointers and Arrays, an Overview of Pointers.

Linked Lists: Introduction to Lists and Linked Lists, Dynamic Memory Allocation, Basic Linked List Operations, Doubly Linked List, Circular Linked List, Atomic Linked List, Linked List in Arrays, Linked List versus Arrays.

UNIT III:

Stacks: Introduction to Stacks, Stack as an Abstract Data Type, Representation of Stacks through Arrays, Representation of Stacks through Linked Lists, Applications of Stacks,Stacks and Recursion. Queues: Introduction, Queue as an Abstract data Type, Representation of Queues, Circular Queues, Double Ended Queues- Deques, Priority Queues, Application of Queues.

UNITIV:

Binary Trees: Introduction to Non- Linear Data Structures, Introduction Binary Trees, Types of Trees, Basic Definition of Binary Trees, Properties of Binary Trees, Representation of Binary Trees, Operations on a Binary Search Tree, Binary Tree Traversal, Counting Number of Binary Trees, Applications of BinaryTree.

UNIT V:

Searching and sorting: Sorting – An Introduction, Bubble Sort, Insertion Sort, Merge Sort, Searching – An Introduction, Linear or Sequential Search, Binary Search, Indexed Sequential Search

Graphs: Introduction to Graphs, Terms Associated with Graphs, Sequential Representation of Graphs, Linked Representation of Graphs, Traversal of Graphs, Spanning Trees, Shortest Path, Application of Graphs.

B Sc	Semester: III	Credits: 4
Course: 3	DATABASE MANAGEMENTSYSTEM	Hrs/Wk: 4

Aim and objectives of Course:

The objective of the course is to introduce the design and development ofdatabases withspecial emphasis on relationaldatabases.

Learning outcomes of Course: Upon successful completion of the course, a student will be able to:

Gain knowledge of Database andDBMS.

Understand the fundamental concepts of DBMS with special emphasis onrelational data model.

Demonstrate an understanding of normalization theory and apply suchknowledge tothe normalization of adatabase

Model data base using ER Diagrams and design database schemas based onthemodel.

Create a small database usingSQL.

Store, Retrieve data indatabase.

Detailed Syllabus: (Five units with each unit having 12 hours of class work)

UNIT I:

Overview of Database Management System: Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Various Data Models, Components of Database Management System, three schema architecture of data base, costs and risks of databaseapproach.

UNIT II:

Entity-Relationship Model: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, IS A relationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, advantages of ER modeling.

UNIT III:

Relational Model: Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC), Functional dependencies and normal forms upto 3rdnormalform.

UNIT IV:

Structured Query Language: Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Join Operation, Set Operations, View, Sub Query.

UNIT V

PL/SQL: Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Procedure, Function, Database Triggers, Types of Triggers.

B Sc	Semester: IV	Credits: 4
Course: 4	OBJECT ORIENTED PROGRAMMING USING JAVA	Hrs/Wk: 4

Aim and objectives of Course:

To introduce the fundamental concepts of Object-Oriented programming and todesign & implement object oriented programming concepts inJava.

Learning outcomes of Course:

Understand the benefits of a well-structuredprogram

Understand different computer programmingparadigms

Understand underlying principles of Object-Oriented Programming inJava

Develop problem-solving and programming skills using OOPconcepts

Develop the ability to solve real-world problems through software developmentin high-level programming language likeJava

Detailed Syllabus: (Five units with each unit having 12 hours of class work)

UNIT I:

Introduction to Java: Features of Java, The Java virtual Machine, Parts of Java

Naming Conventions and Data Types: Naming Conventions in Java, Data Types in Java, Literals **Operators in Java**: Operators, Priority of Operators. **Control Statements in Java**: if... else Statement, do... while Statement, while Loop, for Loop, switch Statement, break Statement, continue Statement, return Statement. **Input and Output:** Accepting Input from the Keyboard, Reading Input with Java.util.Scanner Class, Displaying Output with System.out.printf(), Displaying Formatted Output with String.format(). **Arrays:** Types of Arrays, Three Dimensional Arrays (3D array), array name. length, Command LineArguments

UNIT II:

Strings: Creating Strings, String Class Methods, String Comparison, Immutability of Strings. **Introduction to OOPs**: Problems in Procedure Oriented Approach, Features of Object- Oriented Programming System (OOPS). **Classes and Objects**: Object Creation, Initializing the Instance Variables, Access Specifiers,Constructors.

Methods in Java: Method Header or Method Prototype, Method Body, Understanding Methods, Static Methods, Static Block, The keyword 'this', Instance Methods, Passing Primitive Data Types to Methods, Passing Objects to Methods, Passing Arrays to Methods, Recursion, Factory Methods. **Inheritance:** Inheritance, The keyword 'super', The Protected Specifier, TypesofInheritance.

UNIT III:

Polymorphism: Polymorphism with Variables, Polymorphism using Methods, Polymorphism with Static Methods, Polymorphism with Private Methods, Polymorphism with Final Methods, final Class. **Type Casting**: Types of Data Types, Casting Primitive Data Types, Casting Referenced Data Types, The Object Class. **Abstract Classes**: Abstract Method and Abstract Class.

Interfaces: Interface, Multiple Inheritance using Interfaces. **Packages:** Package, Different Types of Packages, The JAR Files, Interfaces in a Package, Creating Sub Package in a Package, Access Specifiers in Java, Creating API Document. **Exception Handling:** Errors in Java Program, Exceptions, throws Clause, throw Clause, Types of Exceptions, Re – throwing anException.

UNIT – IV

Streams: Stream, Creating a File using FileOutputStream, Reading Data from a File uingFileInputStream, Creating a File using FileWriter, Reading a File using FileReader, Zipping and Unzipping Files, Serialization of Objects, Counting Number of Characters in a File, File Copy, File Class

Threads: Single Tasking, Multi Tasking, Uses of Threads, Creating a Thread and Running it, Terminating the Thread, Single Tasking Using a Thread, Multi Tasking Using Threads, Multiple Threads Acting on Single Object, Thread Class Methods, Deadlock of Threads, Thread Communication, Thread Priorities, thread Group, Daemon Threads, Applications of Threads, Thread Life Cycle.

UNIT V:

Applets: Creating an Applet, Uses of Applets, <APPLET> tag, A Simple Applet, An Applet with Swing Components, Animation in Applets, A Simple Game with an Applet, Applet Parameters.

Java Database Connectivity: Database Servers, Database Clients, JDBC (Java Database Connectivity), Working with Oracle Database, Working with MySQL Database, Stages in a JDBC Program, Registering the Driver, Connecting to a Database, Preparing SQL Statements, Using jdbc–

odbc Bridge Driver to Connect to Oracle Database, Retrieving Data from MySQL Database, Retrieving Data from MS Access Database, Stored Procedures and CallableStatements, Types of ResultSets.

B Sc	Semester: IV	Credits: 4
Course: 5	OPERATING SYSTEMS	Hrs/Wk: 4

Aim and objectives of Course:

This course aims to introduce the structure and organization of a file system. It emphasizes various functions of an operating system like memory management, process management, device management,etc.

Learning outcomes of Course:

Upon successful completion of the course, a student will be able to:

Know Computer system resources and the role of operating system in resourcemanagement withalgorithms

Understand Operating System Architectural design and itsservices.

Gain knowledge of various types of operating systems including UnixandAndroid.

Understand variousprocessmanagement concepts including scheduling, synchronization, anddeadlocks.

Have a basic knowledge aboutmultithreading.

Comprehend different approaches for memorymanagement.

Understand and identify potential threats to operating systems and the securityfeatures design to guard againstthem.

Specify objectives of modern operating systems and describe how operatingsystems have evolved overtime.

Describe the functions of a contemporary operatingsystem

Detailed Syllabus: (Five units with each unit having 12 hours of class work)

UNITI:

What is Operating System? History and Evolution of OS, Basic OS functions, Resource Abstraction, Types of Operating Systems– Multiprogramming Systems, Batch Systems, Time Sharing Systems; Operating Systems for Personal Computers, Workstations and Hand-held Devices, Process Control & Real time Systems.

UNITII:

Processor and User Modes, Kernels, System Calls and System Programs, System View of the Process and Resources, Process Abstraction, Process Hierarchy, Threads, Threading Issues, Thread Libraries; Process Scheduling, Non-Preemptive and Preemptive Scheduling Algorithms.

UNIT III:

Process Management: Deadlock, Deadlock Characterization, Necessary andSufficient Conditions for Deadlock, Deadlock Handling Approaches: Deadlock Prevention, Deadlock Avoidance and Deadlock Detection and Recovery. Concurrent and Dependent Processes, Critical Section, Semaphores, Methods for Inter- process Communication; Process Synchronization, Classical Process Synchronization Problems: Producer-Consumer, Reader-Writer.

UNIT IV:

Memory Management: Physical and Virtual Address Space; MemoryAllocation Strategies– Fixed and -Variable Partitions, Paging, Segmentation, VirtualMemory.

UNIT V:

File and I/O Management, OSsecurity : Directory Structure, File Operations, File Allocation Methods, Device Management, Pipes, Buffer, Shared Memory, Security Policy Mechanism, Protection, Authentication and Internal Access Authorization Introduction to Android Operating System, Android DevelopmentFramework,AndroidApplication Architecture, Android Process Management and File System, SmallApplication Development using Android Development Framework.

SUBJECT
BOTANY

Sem	CourseNo	Course Name	Course Type (T/P/L)	Hrs/Week	Credits	Max. Marks	Max. Marks
				Science: 4+2	Science: 4+2	Count/Internal/ Mid Assessment	Sem- End Exam
I	1	Fundamentals of Microbes and Non-vascularPlants	T	4	4	25	75
	2	Fundamentals of Microbes and Non-vascular Plants	L	2	1	-	50
II	3	Basics of Vascular plants and Phytogeography	T	4	4	25	75
	4	Basics of Vascular plants and Phytogeography	L	2	1	-	50
III	5	Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity	T	4	4	25	75
	6	Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity	L	2	1	-	50
	7	Plant Physiology and Metabolism	T	4	4	25	75
	8	Plant Physiology and Metabolism	L	2	1	-	50
	9	Cell Biology, Genetics	T	4	4	25	75

IV		and Plant Breeding					
	10	Cell Biology, Genetics and Plant Breeding	L	2	1	-	50
V	11 &12	Three (3) pairs ofcourses (each pair has 2 related courses) will be offered, student has to choose a pair of courses.					

DETAILS OF COURSE TITLES & CREDITS

Learning Outcomes: On successful completion of this course, the students will be able to:

Explain origin of life on theearth.

Illustrate diversity among the viruses and prokaryotic organisms and can categorizethem.

Classify fungi, lichens, algae and bryophytes based on their structure, reproduction and lifecycles.

Analyze and ascertain the plant disease symptoms due to viruses, bacteria andfungi.

Recall and explain the evolutionary trends among amphibians of plant kingdom for their shift to land habitat.

Evaluate the ecological and economic value of microbes, thallophytes andbryophytes

UNIT I: Origin of lifeandViruses: 12Hrs.

- Origin of life, concept of primary Abiogenesis; Miller and Urey experiment. Five kingdom classification of R.H.Whittaker
- Discovery of microorganisms, Pasteur experiments, germ theory ofdiseases.
- Shape and symmetry of viruses; structure of TMV and Gemini virus; multiplication of TMV; A brief account of Prions andViroids.
- A general account on symptoms of plant diseases caused by Viruses. Transmission ofplant viruses and theircontrol.
- Significance of viruses in vaccine production, bio-pesticides and as cloningvectors.

UNIT II: Special groups of BacteriaandEubacteria12Hrs.

- Brief account of Archaebacteria, Actinomycetes andCyanobacteria.
- Cell structure and nutrition ofEubacteria.
- Reproduction- Asexual (Binary fission and end oospores) and bacterialrecombination (Conjugation, Transformation,Transduction).
- Economic importance of Bacteria with reference to their role in Agriculture andindustry (fermentation andmedicine).
- A general account on symptoms of plant diseases caused by Bacteria; Citruscanker.

UNIT III: Fungi&Lichens 12Hrs.

- General characteristics of fungi and Ainsworth classification (uptoclasses).
- Structure, reproductionand life history of(a)*Rhizopus*(Zygomycota)and (b)*Puccinia* (Basidiomycota).
- Economic uses of fungi in food industry, pharmacy andagriculture.
- A general account on symptoms of plant diseases caused by Fungi; Blast ofRice.
- Lichens- structure and reproduction; ecological and economicimportance.

UNITIV:Algae 12Hrs.

- General characteristics of Algae (pigments, flagellaand reserve food material);Fritsch classification (uptoclasses).
- Thallus organization and life cycles inAlgae.
- Occurrence, structure, reproduction and life cycle of (a) *Spirogyra* (Chlorophyceae) and(b)
- *Polysiphonia*(Rhodophyceae).
- Economic importance ofAlgae.

UNITV: Bryophytes 12Hrs.

- General characteristics of Bryophytes; classification uptoclasses.
- Occurrence, morphology, anatomy, reproduction (developmental details are not needed) andlife cycle of (a) *Marchantia* (Hepaticopsida) and (b)*Funaria*(Bryopsida).
- General account on evolution of sporophytes inBryophyta.

B.Sc.	Semester - II	Credits: 4
Course: 2	Basics of Vascular plants and Phytogeography	Hrs/Wk: 4

Learning Outcomes: On successful completion of this course, the students will be able to:

Classify and compare Pteridophytes and Gymnosperms based on their morphology,anatomy, reproduction and lifecycles.

Justify evolutionary trends in tracheophytes to adapt for landhabitat.

Explain the process of fossilization and compare the characteristics of extinct and extantplants.

Critically understand various taxonomical aids for identification ofAngiosperms.

Analyze the morphology of the most common Angiosperm plants of their localities and recognize theirfamilies.

Evaluate the ecological, ethnic and economic value of different tracheophytes andsummarize their goods and services for humanwelfare.

Locate different phytogeographical regions of the world and India and can analyze theirfloristic wealth.

UNITI:Pteridophytes 12 Hrs.

General characteristics of Pteridophyta; classification of Smith (1955)up todivisions.

Occurrence, morphology, anatomy, reproduction (developmental details are not needed) and life historyof (a) *Lycopodium* (Lycopsida) and (b) *Marsilea*(Filicopsida).

Stelar evolution inPteridophytes;

Heterospory and seedhabit.

UNITII:Gymnosperms **14 Hrs.**

General characteristics of Gymnosperms; Sporne classification up toclasses.

Occurrence, morphology, anatomy, reproduction (developmental details are not needed) andlife history of (a) *Cycas*(Cycadopsida) and (b) *Gnetum*(Gnetopsida).

Outlines of geological timescale.

A brief account on*Cycadeoidea.*

UNIT III: Basic aspectsofTaxonomy **13Hrs.**

Aim and scope of taxonomy; Species concept: Taxonomic hierarchy, species, genus andfamily.

Plant nomenclature : Binomial system, ICBN- rules fornomenclature.

Herbarium and its techniques, BSI herbarium and Kew herbarium; concept of digitalherbaria.

Bentham and Hooker system ofclassification;

Systematic description and economic importance of the followingfamilies:

Annonaceae (b)Curcurbitaceae

UNIT IV:SystematicTaxonomy **13 Hrs.**

Systematic description and economic importance of the followingfamilies:

Asteraceae (b) Asclepiadaceae (c)Amaranthaceae (d)Euphorbiaceae

(e) Arecaceae and (f) Poaceae

Outlines of Angiosperm Phylogeny Group (APGIV).

UNITV: Phytogeography **08 Hrs.**

Principles of Phytogeography, Distribution (wides, endemic, discontinuousspecies)

Endemism – types andcauses.

Phytogeographic regions ofWorld.

Phytogeographic regions ofIndia.

Vegetation types in AndhraPradesh.

B.Sc.	Semester - III	Credits: 4
Course: 3	Anatomy and Embryology of Angiosperms, Plant Ecology and Biodiversity	Hrs/Wk: 4

Learning outcomes: On successful completion of this course, the students will be able to;

Understand on the organization of tissues and tissue systems inplants.

Illustrate and interpret various aspects ofembryology.

Discuss the basic concepts of plant ecology, and evaluate the effects of environmental and biotic factors on plantcommunities.

Appraise various qualitative and quantitative parameters to study the population andcommunity ecology.

Correlate the importance of biodiversity and consequences due to itsloss.

Enlist the endemic/endangered flora and fauna from two biodiversity hot spots in India and assess strategies for theirconservation

UNIT I: Anatomyof Angiosperms **12 Hrs.**

Organization of apical meristems: Tunica-carpus theory and Histogentheory.

Tissue systems–Epidermal, ground andvascular.

Anomalous secondary growth in *Boerhaavia* and*Dracaena.*

Study of timbers of economic importance - Teak, Red sanders andRosewood.

UNIT II: EmbryologyofAngiosperms **12 Hrs.**

Structure of anther, anther wall, types of tapetum. Microsporogenesis and development ofmale gametophyte.

Structure of ovule, megasporogenesis; monosporic (*Polygonum*), bisporic (*Allium*) and tetrasporic (*Peperomia*) types of embryosacs.

Outlines of pollination, pollen – pistil interaction andfertilization.

Endosperm - Types and biological importance - Free nuclear, cellular,helobialandruminate.

Development of Dicot (*Capsella bursa-pastoris*)embryo.

UNIT III: BasicsofEcology **12 Hrs.**

Ecology: definition, branches and significance ofecology.

Ecosystem: Concept and components, energy flow, food chain, food web,ecologicalpyramids.

Plants and environment: Climatic (light and temperature), edaphic and bioticfactors.

Ecological succession:Hydrosere andXerosere.

UNIT IV: Population, Community andProductionEcology **12 Hrs.**

Population ecology: Natality, mortality, growth curves, ecotypes,ecads

Community ecology: Frequency, density, cover, life forms, biologicalspectrum

Concepts of productivity: GPP, NPP and CommunityRespiration

Secondary production, P/R ratio andEcosystems.

UNIT V: BasicsofBiodiversity **12 Hrs.**

Biodiversity: Basic concepts, Convention on Biodiversity - EarthSummit.

Value of Biodiversity; types and levels of biodiversity and Threats tobiodiversity

Biodiversity Hot spots in India.Biodiversity in North Eastern Himalayas and WesternGhats.

Principles of conservation: IUCN threat-categories, RED databook

Role of NBPGR and NBA in the conservation ofBiodiversity.

B.Sc.	Semester - IV	Credits: 4
Course: 4	Plant Physiology and Metabolism	Hrs/Wk: 4

Learning outcomes: On successful completion of this course,the students will be able to;

Comprehend the importance of water in plant life and mechanisms for transport of water and solutes inplants.

Evaluate the role of minerals in plant nutrition and their deficiencysymptoms.

Interpret the role of enzymes in plantmetabolism.

Critically understand the light reactions and carbon assimilation processes responsible for synthesis of foodinplants.

Analyze the biochemical reactions in relation to Nitrogen and lipidmetabolisms.

Evaluate the physiological factors that regulategrowth and development in plants.

Examine the role of light on flowering and explain physiology of plants under stressconditions.

UNIT I:Plant-Water relations **10 Hrs.**

Importance of water to plant life, physical properties of water, diffusion, imbibition, osmosis. water potential, osmotic potential, pressurepotential.

Absorption and lateral transport of water; Ascent ofsap

Transpiration: stomata structure and mechanism of stomatal movements (K^+ ionflux).

Mechanism of phloem transport; source-sinkrelationships.

UNIT II: **Mineral nutrition, EnzymesandRespiration** **14 Hrs.**

Essential macro and micro mineral nutrients and their role in plants; symptoms of mineral deficiency

Absorption of mineral ions; passive and activeprocesses.

Characteristics, nomenclature and classification of Enzymes. Mechanism of enzyme action, enzymekinetics.

Respiration: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, Pentose Phosphate Pathway (HMPshunt).

UNIT III: PhotosynthesisandPhotorespiration **12 Hrs.**

Photosynthesis: Photosynthetic pigments, absorption and action spectra; Red drop andEmerson enhancementeffect.

Concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen;photophosphorylation

Carbon assimilation pathways (C3,C4 andCAM);

Photorespiration - C2pathway

UNIT IV: Nitrogen andlipidmetabolism **12 Hrs.**

Nitrogen metabolism: Biological nitrogen fixation – asymbiotic and symbiotic nitrogen fixing organisms. Nitrogenase enzymesystem.

Lipid metabolism :Classification of Plant lipids, saturated and unsaturated fattyacids.

Anabolism of triglycerides, β-oxidation of fatty acids, Glyoxylatecycle.

UNIT V: Plant growth - development andstressphysiology **12 Hrs.**

Growth and Development: Definition, phases and kinetics ofgrowth.

Physiological effects of Plant Growth Regulators (PGRs) - auxins, gibberellins, cytokinins, ABA, ethylene andbrassinosteroids.

Physiology of flowering :Photoperiodism, role of phytochrome inflowering.

Seed germination andsenescence.

Physiological changes during waterstress.

B.Sc.	Semester - IV	Credits: 4
Course: 5	Cell Biology, Genetics and Plant Breeding	Hrs/Wk: 4

Learning outcomes: On successful completion of this course,the students will be able to:

Distinguish prokaryotic and eukaryotic cells and design the model of acell.

Explain the organization of a eukaryotic chromosomeand the structure of geneticmaterial.

Demonstrate techniques to observe the cell and its componentsunder amicroscope.

Discuss the basics of Mendelian genetics, its variations and interpret inheritance of traits in livingbeings.

Elucidate the role of extra-chromosomal genetic material for inheritance ofcharacters.

Evaluate the structure, function and regulation of geneticmaterial.

Understand the application of principles and modern techniques inplantbreeding.

Explain the procedures of selection and hybridization for improvement ofcrops.

UNIT I: TheCell **12 Hrs.**

Cell theory; prokaryotic vs eukaryotic cell; animal vs plant cell; a brief account on ultra- structure of a plantcell.

Ultra-structure of cellwall.

Ultra-structure of plasma membrane and various theories on itsorganization.

Polymorphic cell organelles (Plastids); ultrastructure of chloroplast. PlastidDNA.

UNITII: Chromosomes **12 Hrs.**

Prokaryotic vs eukaryotic chromosome. Morphology of a eukayoticchromosome.

Euchromatin and Heterochromatin; Karyotype andideogram.

Brief account of chromosomal aberrations - structural and numericalchanges

Organization of DNA in a chromosome (solenoid and nucleosomemodels).

UNIT III: Mendelian andNon-Mendeliangenetics **14Hrs.**

Mendel's laws of inheritance. Incomplete dominance and co-dominance; Multipleallelism.

Complementary, supplementary and duplicate gene interactions (plant based examples are to be dealt).

A brief account of linkage and crossing over; Chromosomal mapping - 2 point and 3 point test cross.

Concept of maternal inheritance (Corren's experiment on *Mirabilis jalapa*); Mitochondrial DNA.

UNIT IV: Structure and functionsof DNA **12 Hrs.**

Watson and Crick model of DNA. Brief account on DNA Replication (Semi- conservative method).

Brief account on Transcription, types and functions of RNA. Gene concept and genetic code and Translation.

Regulation of gene expression in prokaryotes - LacOperon.

UNIT V:PlantBreeding **12 Hrs.**

Plant Breeding and its scope; Genetic basis for plant breeding. Plant Introduction and acclimatization.

Definition, procedure; applications and uses; advantages and limitations of :(a) Massselection,

(b) Pure line selection and (c) Clonal selection.

Hybridization – schemes, and technique; Heterosis(hybridvigour).

brief account on Molecular breeding – DNA markers in plant breeding. RAPD,RFLP.

SUBJECT
ZOOLOGY

Sem	Course no.	CourseName	Course type (T/L/P)	Hrs./Week (Arts/Commerce:5 and Science:4+2)	Credits (Arts/ Commerce: 4and Science:4+1)	Max.Marks Cont/ Internal/ Mid Assessment	Max. Marks Sem-end Exam
I	1	AnimalDiversity–IBiology ofNon-Chordates	T	4	4	25	75
	2	AnimalDiversity–IBiology ofNon-Chordates Lab	L	2	1	-	50
II	3	Animal Diversity – IIBiologyofChordates	T	4	4	25	75
	4	AnimalDiversity –II Biology ofChordatesLab	L	2	1	-	50
III	5	Cellbiology,Genetics, MolecularBiology& Evolution	T	4	4	25	75
	6	Cellbiology,Genetics, MolecularBiology& Evolution Lab	L	2	1	-	50
IV	7	Physiology,CellularMetabolism &Embryology	T	4	4	25	75
	8	Physiology,Cellular Metabolism &EmbryologyLab	L	2	1	-	50
	9	Immunology& AnimalBiotechnology	T	4	4	25	75
		Immunology& AnimalBiotechnologyL					

	10	ab	L	2	1	-	50
V							

B.Sc	Semester:I	Credits:4
Paper:1	AnimalDiversity–BiologyofNonchordates	Hrs/Wk:4

CourseOutcomes: Bythecompletionofthecoursethegraduateshouldableto–

Describegeneraltaxonomicrulesonanimalclassification

ClassifyProtozoatoCoelenteratawithtaxonomickeys

ClassifyPhylumPlatyhemninthestoAnnelidaphylumusingexamplesfromparasiticadaptationandvermin composting

Describe Phylum Arthropodato Molluscausing examples andimportance of insects andMolluscans

DescribeEchinodermatatoHemichordatewithsuitableexamplesandlarvalstagesinrelationtothephylogeny

Learningobjectives

Tounderstandthetaxonomicpositionofprotozoatohelminthes.

Tounderstandthegeneralcharacteristicsofanimalsbelongingtoprotozoatohemichordate.

Tounderstandthestructuralorganizationofanimal'sphylumfromprotozoatohemichordate.

Tounderstandtheoriginandevolutionaryrelationshipofdifferentphylafromprotozoatohemichordate.

Tounderstandtheoriginandevolutionaryrelationshipofdifferentphylumfromannelidstohemichordates.

UNITI:

Principles of Taxonomy – Binomial nomenclature – Rules of nomenclature Whittaker's five kingdom conceptandclassificationofAnimalKingdom.

PhylumProtozoa: GeneralCharactersandclassificationofprotozoauptospecieslevelwithsuitableexamplesL ocomotion,nutritionandreproductioninProtozoan's*Elphidium(typestudy)*

UNITII:

PhylumPorifera: Generalcharactersandclassificationuptospecieslevelwithsuitableexamples SkeltoninSponges Canalsysteminsponges

PhylumCoelenterate: Generalcharactersandclassificationuptospecieslevelwithsuitableexamples Mutagenesisin*Obelia*, Polymorphismin coelenterates, Coralsandcoralreefsformation

PhylumCtenophore: GeneralCharactersandEvolutionarysignificance(affinities)

UNITIII:

PhylumPlatyhelminthes: Generalcharactersandclassificationuptospecieslevelwithsuitableexamples Lifecycleand pathogencityof*Fasciolahepatica*ParasiticAdaptationsinhelminthes

PhylumNemathelminthes: Generalcharactersandclassificationuptospecieslevelwithsuitableexamples Lifecyclean dpathogencityof*Ascaris lumbricoides*

UNITIV:

PhylumAnnelida: Generalcharactersandclassificationuptospecieslevelwithsuitableexamples*Hirudinariagranulosa*-Externalcharacters,digestivesystem,excretorysystemandreproductivesystem,Evolution of Coelom and Coelomoducts, Vermiculture - Scope, significance, earthworm species, processing,Vermicompost,economicimportanceofvermincompost

Phylum Arthropoda : General characters and classification up to species level with suitable examples Prawn-Externalcharacters,appendages,respiratorysystemandcirculatorysystemVisionandrespirationinArthropoda,Metamorphosisin Insects*Peripatus*-StructureandaffinitiesSocialLifeinBeesandTermites

UNITV:

PhylumMollusca: Generalcharactersandclassificationuptospecieslevelwithsuitableexamples,PearlformationinPelecypoda,SenseorgansinMollusca,Torsioningastropods

PhylumEchinodermata:Generalcharactersandclassificationuptospecieslevelwithsuitableexamples,Watervascularsystemin starfish, LarvalformsofEchinodermata

PhylumHemichordate: Generalcharactersandclassificationuptospecieslevelwithsuitableexamples,

Balanoglossus-Structureandaffinities

B.Sc	Semester:II	Credits:4
Paper:2	AnimalDiversity–BiologyofChordates	Hrs/Wk:4

CourseOutcomes:Bythecompletionofthecoursethegraduateshouldableto-

Describegeneraltaxonomicrulesonanimalclassificationofchordates

ClassifyProtochordatatoMammalianwithtaxonomickeys

UnderstandMammalswithspecificstructuraladaptations

Understandthesignificanceofdentitionandevolutionarysignificance

Understandtheoriginandevolutionaryrelationshipofdifferentphylafrom Prochordatatomammalian.

Learningobjectives

Tounderstandtheanimalkingdom.

TounderstandthetaxonomicpositionofProtochordatatoMammalian.

TounderstandthegeneralcharacteristicsofanimalsbelongingtoFishestoReptilians.

Tounderstandthebodyorganizationof Chordata.

TounderstandthetaxonomicpositionofProtherianmammals.

UNITI:

Generalcharacters and classification of ChordatauptospecieslevelProtochordata- Salient features ofCephalochordate,Structureof*Branchiostoma*AffinitiesofCephalochordate.SalientfeaturesofUrochordataStructureandlifehistoryof*Herdmania*Retrogressivemetamorphosis–ProcessandSignificance.

UNITII:

Cyclostomata, General characters, Comparison of *Petromyzon* and *Myxine* Pisces: General characters andclassificationofFishesuptospecieslevel***Scoliodon*:**Externalfeatures,Digestivesystem,Respiratorysystem, Structure and function of Heart, Structure and functions of the Brain. Migration in Fishes Types ofScales Dipnoi.

UNITIII:

GeneralcharactersofAmphibianClassificationofAmphibianuptospecieslevelwithexamples.***Ranahexadactyla*:** External features, Digestive system, Respiratory system, Structure and function of Heart,structure and functionsoftheBrain

Reptilia: GeneralcharactersofReptilia,ClassificationofReptiliauptospecieslevelwithexamples

Calotes: External features, Digestive system, Respiratory system, Structure and function of Heart, structureandfunction ofBrain IdentificationofPoisonousandnon-poisonoussnakesandSkullinreptiles.

UNITIV:

Aves: General characters and classification of Aves upto species level *Columba livia*: External features,Digestivesystem,Respiratorysystem,Structureand function of Heart, structure and function of BrainMigrationinBirds Flightadaptationinbirds.

UNITV:

GeneralcharactersofMammalianClassificationofMammalianuptospecieslevelwithexamplesComparisonofPrototherians,MetatheriansandEutheriansDentitionin mammals

B.Sc	Semester:III	Credits:4
Paper:3	CellBiology,Genetics,MolecularBiology andEvolution	Hrs/Wk:4

CourseOutcomes:

The overall course outcome is that the student shall develop deeper understanding of what life is and how itfunctions at cellular level. Thiscoursewillprovidestudents with a deepknowledgeinCell Biology,AnimalBiotechnologyandEvolutionandbythecompletionof thecoursethegraduateshallableto–

To understand the basic unit of the living organisms and to differentiate the organisms by their cellstructure.

Describefinestructureandfunctionofplasmamembraneanddifferentcellorganellesofeukaryoticcell.

To understand the history of origin of branch of genetics, gain knowledge on heredity, interaction ofgenes,varioustypesofinheritancepatternsexistinginanimals

Acquiring in-depth knowledge on various of aspects of genetics involved in sex determination, humankaryotyping andmutationsofchromosomesresultingin variousdisorder.

Understand the central dogma of molecular biology andflowofgeneticinformation from DNA toproteins.

Understand the principles and forces of evolution of life on earth,theprocessof evolution of newspecies and apply the same to develop new and advanced varieties of animals for the benefit of thesociety.

LearningObjectives

Tounderstandtheoriginofcellanddistinguishbetweenprokaryoticandeukaryoticcell.

Tounderstandtheroleofdifferentcellorganellesinmaintenanceoflifeactivities.

Toprovidethehistoryandbasicconceptsofheredity,variationsandgeneinteraction.

Toenablethestudentsdistinguishbetweenpolygenic,sex-linked,andmultipleallelicmodesofinheritance.

Toacquaintstudentwithbasicconceptsofmolecularbiologyastohowcharactersareexpressedwithacoordinatedfunctioningofreplication,transcriptionand translationinalllivingbeings.

Toprovideknowledgeonoriginoflife,theoriesandforcesofevolution.

Tounderstandtheroleofvariationsandmutationsinevolutionoforganisms.

UNITI:

Cell Biology: Definition, history, prokaryotic and eukaryotic cells, virus, viroids, mycoplasma Electronmicroscopicstructureofanimalcell.Plasmamembrane–Modelsandtransportfunctionsofplasmamembrane. Structureand functionsofGolgi complex,EndoplasmicReticulum and Lysosomes StructureandfunctionsofRibosomes,Mitochondria,Nucleus,Chromosomes

(Note: 1. General pattern of study of each cell organelle – Discovery, Occurrence,Number, Origin,StructureandFunctionswithsuitablediagrams**)**

2.Neednotstudycellularrespirationundermitochondrialfunctions)

UNITII:

Genetics-I: Mendel'sworkontransmissionoftraitsGeneInteraction–IncompleteDominance,Codominance, Lethal Genes Polygene's (General Characteristics & examples); Multiple Alleles (GeneralCharacteristics and Blood group inheritance Sex determination (Chromosomal, Genic Balance, Hormonal,Environmental and Haplo- diploidy types of sex determination) Sex linkedinheritance (X-linked,Y-linked&XY-linkedinheritance)

UNITIII:

Genetics-II: Mutations&Mutagenesis,ChromosomalDisorders(AutosomalandAllosomal)HumanGenetics–Karyotyping,PedigreeAnalysis(basics)BasicsonGenomicsandProteomics

UNITIV:

MolecularBiology: CentralDogmaofMolecularBiologyBasicconceptsof-

DNAreplication–Overview(Semi-conservativemechanism,Semi-discontinuousmode,Origin&Propagationofreplication fork)

Transcriptioninprokaryotes–Initiation,ElongationandTermination,Post-transcriptionalmodifications(basics)

Translation–Initiation,ElongationandTerminationGeneExpressioninprokaryotes(LacOperon); GeneExpressionineukaryotes

UNITV:

Origin of life Theories of Evolution: Lamarckism, Darwinism, Germ Plasm Theory, Mutation Theory Neo-Darwinism:ModernSynthetic, Theory of Evolution, Hardy-Weinberg Equilibrium Forces of Evolution:Isolatingmechanisms,GeneticDrift,NaturalSelection,Speciation

B.Sc	**Semester:IV**	**Credits:4**
Paper:4	**AnimalPhysiology,CellularMetabolism**and**Embryology**	**Hrs/Wk:4**

CourseOutcomes:

ThiscoursewillprovidestudentswithadeepknowledgeinPhysiology,CellularmetabolismandMolecular Biologyandbythe completion ofthe coursethegraduateshallableto–

Understandthefunctionsofimportantanimalphysiologicalsystemsincludingdigestion,cardio-respiratoryandrenalsystems.

Understand the muscular system and the neuro-endocrine regulation of animal growth, development andmetabolismwith aspecialknowledgeofhormonalcontrolof human reproduction.

Describethestructure,classificationandchemistryofBiomoleculesandenzymesresponsibleforsustenanceoflifein livingorganisms

DevelopbroadunderstandingthebasicmetabolicactivitiespertainingtothecatabolismandanabolismofvariousBiomolecules

Describethekeyeventsinearlyembryonicdevelopmentstartingfromtheformationofgametesuptogastrulaionandformationofprimarygermlayers.

LearningObjectives

Toachieveathoroughunderstandingofvariousaspectsofphysiologicalsystemsandtheirfunctioning inanimals.

Toinstiltheconceptofhormonalregulationofphysiology,metabolismandreproduction inanimals.

Tounderstandthedisordersassociatedwiththedeficiencyofhormones

Todemonstrateathoroughknowledgeoftheintersectionbetweenthedisciplinesof BiologyandChemistry.

Toprovideinsightfulknowledgeonthestructureandclassificationofcarbohydrates,proteins,lipidsandenzymes

Todemonstrateanunderstandingoffundamentalbiochemicalprinciplessuchasthefunctionof Biomolecules,metabolicpathways andthe regulationof biochemicalprocesses

To make students gain proficiency in laboratory techniques in biochemistry and orient them to apply thescientificmethodtotheprocesses of experimentationand hypothesistesting.

UNITI:

AnimalPhysiology-I: Processofdigestionandassimilation,Respiration-Pulmonaryventilation,transport of oxygen and CO_2, (Note: Need not study cellular respiration here), Circulation - Structure andfunctioning of heart, Cardiac cycle, Excretion - Structure and functions of kidney urine formation, countercurrentMechanism

UNITII:

AnimalPhysiology-II: Nerve impulse transmission - Resting membrane potential, origin and propagationof action potentials along myelinated and non-myelinated nerve fibers. Musclecontraction- Ultrastructureof muscle, molecular and chemical basis of muscle contraction. Endocrine glands - Structure, functions ofhormones ofpituitary,thyroid, parathyroid, adrenal glands and pancreas, Hormonal control of reproductioninamammal

UNITIII:

CellularMetabolism–I(Biomolecules) Carbohydrates-Classificationofcarbohydrates.Structureofglucose Proteins - Classification of proteins. General properties of amino acids Lipids - Classification oflipids.Enzymes:ClassificationandMechanismofAction

UNITIV:

Cellular Metabolism –II: Carbohydrate Metabolism - Glycolysis, Krebs cycle, Electron Transport Chain,Glycogen metabolism,Gluconeogenesis,LipidMetabolism–Synthesisoffattyacids,β-oxidationofpalmiticacidProteinmetabolism-Transamination,DeaminationandUreaCycle

UNITV:

Embryology: GametogenesisFertilization,TypesofeggsTypesofcleavages,DevelopmentofFroguptoformationofprimarygermlayers

B.Sc	Semester:IV	Credits:4

Paper:5	ImmunologyandAnimalBiotechnology	Hrs/Wk:4

CourseOutcomes:

Thiscoursewillprovidestudentswithadeepknowledgeinimmunology,genetics,embryologyandecologyan dbythecompletionofthecoursethegraduateshallableto–

Togetknowledgeoftheorgansof Immunesystem,typesofimmunity,cellsandorgansofimmunity.

Todescribeimmunologicalresponseastohowitistriggered(antigens)andregulated(antibodies)

UnderstandtheapplicationsofBiotechnologyinthefieldsofindustryandagricultureincludinganimal cell/tissueculture,stemcelltechnologyandgeneticengineering.

Getfamiliarwiththetoolsandtechniquesofanimalbiotechnology.

LearningObjectives

Totracethehistoryanddevelopmentofimmunology

Toprovidestudentswithafoundationinimmunologicalprocesses

To be able to compare and contrast the innate versus adaptive immune systems and humoral versuscell-mediated immuneresponses

Understand the significance of the Major His to compatibility Complex in terms of immune responseandtransplantation

Toprovideknowledgeonanimalcellandtissueculture andtheirpreservation

To empower students with latest biotechnology techniques like stem cell technology, geneticengineering, hyridomatechnology,transgenictechnology and theirapplicationin medicine andindustryforthebenefitofliving organisms

To explain *in vitro* fertilization, embryo transfer technology and other reproduction manipulationmethodologies.

To get insight in applications or recombinantDNAtechnologyinagriculture, production oftherapeuticproteins.

Tounderstandprinciplesofanimalculture,mediapreparation.

UNITI:

Immunology–I(OverviewofImmunesystem): Introduction to basic concepts in Immunology, Innateandadaptiveimmunity,VaccinesandImmunizationprogramme, Cells of immune system,Organsofimmunesystem

UNITII:Immunology–II(Antigens,Antibodies,MHCandHypersensitivity)

Antigens: Basic properties of antigens, B and T cell epitomes, happens and aJjuvant; Factors influenci f\gimmunogenicity

Antibodies:Structureof antibody,Classcs and functions of antibodies Structure and functions of major histo compatibility complcxcs, Exogenous and Endogenous pathways I antigen presentation and processingHyperscnsitivity—ClassificationandTypcs

UNlTlll:

Techniques: Animal Cell, Tissue and Organ culture media: Natural and Synthetic media, Cell cultures:Establishment of cell culture (primary culture, secondary culture, types of cell lines; Protocols for PrimaryCell Culture); Established Cell lines (common examples such as MRC, HeLa. CHO, BHK, hero); Organculture;Cryopreservationofcu1tures

Stem cels: Types of sem cell and appWcaGons Hybridoma Technology: Roducton & applications ofMonoclonalantibodies(mAb)

UNITIV:

Applications of Animal Biotechnology: Genetic Engineering: Basic concept, Vectors, Restriction EndonucleasesandRecombinantDNAtechnology

Genedeliver y: Microinjection, electroportion, biolistic method (gene gun), liposome and viral-mediatedgenedelivery

Trsesgexic Animals: Strategies of Gene transfer; Transgenic - shceP fish: applications Manipulation ofreproductioninanimals: Artificiallnseminztion,/nvi/r o fertilization,superovuIation,Embryotransfer,Embry‹›cloning

UNITV:

PCR:BasicsofPCR.

DNASequencirig: Sanger' smethodofDNAsequencing-traditionalandautomatcd sequencing(2hrs)Hybridization techniques: Southern, Northern and Western blotting DNA fingerprinting: Procedurc andapplications

ApplicxtionsiaIndv•tr ysndAgriculture:Fermentation:Diffe renttypcsofFermentationandDownstre am processing;

Agricul ture: Monocu1ture infishes, polyp loidy infishes

PRINCIPAL
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