COURSE STRUCTURE
&
DETAILED SYLLABUS
(R24 Regulation)

For
Bachelor of Computer Application
I-Year (BCA)
(Applicable for Batches Admitted from 2024-2025)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY- GURAJADA VIZIANAGARAM
VIZIANAGARAM - 535003, ANDHRA PRADESH, INDIA

BCA - COURSE STRUCTURE – R24

(Applicable from the academic year 2024-25 onwards)

I- BCA I-Semester					
S.No	**Course Name**	**No of Hrs/Week**			**Credits**
		L	**T**	**P**	
1.	English-I	4	0	0	4
2.	Second Language-Hindi/Urdu/Telugu/Sanskrit-I	4	0	0	4
3.	Fundamentals of Commerce	3	0	0	3
4.	Business Organization	3	0	0	3
5.	Skill course-I	2	0	0	2
6.	Skill course-II	2	0	0	2
7.	Multidisciplinary Course: • Introduction to Social Work • Principles of Psychology • Indian History • Principles of Biological Sciences • Principles of Chemical Sciences • Principles of Physical Sciences	2	0	0	2
	Total	20	**0**	**0**	**22**

Skill course-I &II:

1. Entrepreneurship Development
2. Leadership Skills
3. Analytical Skills
4. Communication Skills

NOTE: Students are not permitted to choose the repeat courses already undergone at the higher secondary level or Intermediate level or 12th class and the major discipline chosen as the multidisciplinary course.

I- BCA II-Semester					
S.No	**Course Name**	**No of Hrs/Week**			**Credits**
		L	**T**	**P**	
1.	English-II	4	0	0	3
2.	Second Language- Hindi/Urdu/Telugu/Sanskrit-II	4	0	0	3
3.	Programming in C	3	0	0	3
4.	Office Automation Tools	3	0	0	3
5.	Skill Enhancement Course-I: 1. Business Writing 2. Stock Marketing Operations	2	0	0	2
6.	Skill Enhancement Course-II: 1. Marketing Skills 2. Investment Planning 3. Digital Literacy	2	0	0	2
7.	Minor -I • Basic Drawing • Computer Networks • Graphic Design • R Programming • Fundamentals of Computer	3	0	2	4
8.	Programming in C Lab	0	0	2	1
9.	Office Automation Tools Lab	0	0	2	1
	Total	21	**0**	**6**	**22**

Note: The student can choose a minor from the given disciplines and same discipline has to be continued in next semesters.

Minor Tracks:

- Animation
- Cloud Computing
- Multimedia
- Data Science
- Cyber Forensics

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM

MINOR COURSE STRUCTURE

(w.e.f. AY 2024-25)

S.No	Name of Discipline	Name of the Courses			
		Semester-II	**Semester-III**	**Semester-IV**	**Semester-V**
1	Animation	1. Basic Drawing (T) Basic Drawing Lab (P)	2. 2D Animation (T) 2D Animation Lab (P)	3. Introduction to 3D (T) Introduction to 3D Lab (P) 4. Compositing-I (T) Compositing-I Lab (P)	5. Advanced 3D (T) Advanced 3D Lab (P) 6. Compositing-II (T) Compositing-II Lab (P)
2	Cloud Computing	1. Computer Networks (T) Computer Networks Lab (P)	2. Cloud Computing(T) Cloud Computing Lab (P)	3. AWS for Cloud Computing(T) AWS for Cloud Computing Lab (P) 4. Data Mining and Data warehousing(T) Data Mining and Data warehousing Lab (P)	5. Python Programming (T) Python Programming Lab (P) 6. Data Analytics Methods(T) Data Analytics Methods Lab (P)
3	Multimedia	1. Graphic Design (T) Graphic Design Lab (P)	2. Introduction to 3D (T) Introduction to 3D Lab (P)	3. Fundamentals of Filmmaking (T) Fundamentals of Filmmaking Lab (P) 4. Nuendo (T) Nuendo Lab (P)	5. Story Board Design (T) Story Board Design Lab (P) 6. Character Animation (T) Character Animation Lab (P)
4	Data Science	1. R Programming(T) R Programming Lab (P)	2. Python Programming for Data Analysis(T) Python Programming for Data Analysis Lab (P)	3. Data visualization using Tableau(T) Data visualization using Tableau Lab (P) 4. Data visualization using python(T) Data visualization using python Lab (P)	5. Supervised Machine Learning with Python(T) Supervised Machine Learning with Python Lab (P) 6. Unsupervised Machine Learning with Python(T)

					Unsupervised Machine Learning with Python Lab (P)
5	Cyber Forensics	1. Fundamentals of Computer(T) Fundamentals of Computer Lab (P)	2. Cyber Security(T) Cyber Security Lab (P)	3. Cyber Tools & Techniques(T) Cyber Tools & Techniques Lab (P) 4. Digital Forensics(T) Digital Forensics Lab (P)	5. Mobile Forensics(T) Mobile Forensics Lab (P) 6. Multimedia Forensics & Speaker Identification(T) Multimedia Forensics & Speaker Identification Lab (P)

I Year-I Semester

L	T	P	C
4	0	0	3

A Course in Communication and Soft Skills

Objectives & Outcomes:

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

- Understand the importance of listening and practice effective listening.
- Use grammar effectively for accuracy in writing and speaking.
- Use relevant vocabulary in everyday communication.
- Acquire ability to use Soft Skills in professional and daily life.
- Confidently use the skills of communication.

UNIT-I: Listening Skills

a. Importance of Listening

b. Types of Listening

c. Barriers to Listening

d. Effective Listening

UNIT-II: Phonetics

a. Sounds of English: Vowels and Consonants

b. Syllable

c. WordStress

d. Intonation

UNIT-III: Grammar

a. Concord

b. Articles

c. Prepositions

d. Tenses

e. Question tags

UNIT-IV: Speaking Skills

a. Greetings & Introduction

b. Asking and Giving Information

c. Yes, We Can Barack Obama

d. Agreeing/ Disagreeing

e. A Leader Should Know How to Manage Failure Dr. A.P.J. Abdul Kalam

UNIT-V: Soft Skills

a. SWOC

b. Attitude

c. Emotional Intelligence

d. Netiquette

e. Interpersonal Skills

References:

1. Soft Skills, Dr. Alex (New Delhi: S. Chand &Company Ltd) 2009.
2. Interpersonal Skills Training, Philip Burnard (New Delhi: Viva Books Private Ltd)
3. Soft Skills for Everyone, Jeff Butterfield (New Delhi: Cengage Learning India Pvt Ltd) 2012
4. Emotional Intelligence, Daniel Goleman (London: Bloomsbury Publishing) 1996
5. A Text Book of English Phonetics for Indian Students, Balasubramanian
6. A Handbook for English Language Labor, E. Suresh Kumar, P. Sreehari
7. Communication Skills (2nd Edition), Sanjay Kumar &PushpLata, Oxford University Press, 2016.

Activities:

- Make the students listen to news excerpts.
- Watch interviews and speeches on You Tube.
- Role plays on formal and informal conversations.

I Year-I Semester

L	T	P	C
4	0	0	3

Hindi Gadya Sahitya

Units: 5

Periods: 60

लक्ष्य:

१. विद्यार्थियों को गद्य की विविध विधाओं से परिचित करवाना।

२. हिन्दी भाषा के विशिष्ट साहित्यकारों का परिचय उनकी रचनाओं की विशिष्टता का ज्ञान प्राप्त कर पाना।

३. हिन्दी साहित्य के संक्षिप्त इतिहास से परिचित करवाना।

४. हिन्दी व्याकरण की सभी पहलुओं पर विद्यार्थियों को विशद रूप अध्ययन कराना, क्योंकि व्याकरण ही भाषा की रीढ़ होती है।

५. विद्यार्थियों को पत्र लेखन के आवश्यक नियमों से अवगत कराना , शिष्ट भाषा का प्रयोग एवं प्रभावपूर्ण लेखन विधि से परिचित करवाना।

Unit-I

१.मित्रता - आचार्य रामचंद्र शुक्ल

२.साहित्य की महत्ता - महावीर प्रसाद द्विवेदी

३.बिंदा - महादेवी वर्मा

Unit-II

१.मुक्तिधन - प्रेमचन्द

२.पुरस्कार - जयशंकर प्रसाद

३. और वह पढ़ गई - डॉ कुसुम वियोगी.

Unit -III

१.हिन्दी साहित्य का इतिहास -

सामान्य परिचय

२.काल विभाजन

Unit - IV

१.कार्यालयीन शब्दावली (अंग्रेजी से हिन्दी, हिन्दी से अंग्रेजी)

२.लिंग

३.वचन

४.काल

५.कारक

Unit - V

पत्र लेखन

१. व्यक्तिगत पत्र

२. आवेदन पत्र

(छुट्टी पत्र, पिता जी के नाम पर पत्र , मित्र के नाम पर पत्र,प्राध्यापक पद केलिए आवेदन पत्र, अनुवादक पद केलिए आवेदन पत्र)

परिणाम: पाठ्यक्रम के सफल समापन के उपरांत विद्यार्थी निम्न विषयों में सक्षम होंगे।

१. निबंध, रेखाचित्र, कहानी जैसी गद्य की विभिन्न विधाओं को समझ पाना एवं विश्लेषण कर पाना।

२.सच्चे मित्र के गुणों से अवगत हो पाना,जो की स्नातक स्तर के विद्यार्थियों केलिए अति आवश्यक है।

३.पठित रचनाओं में दर्शित सामाजिक, ऐतिहासिक , सांस्कृतिक आदि संदर्भों का मूल्यांकन कर पाना।

४.धार्मिक सहिष्णुता,देश प्रेम आदि उत्तम भावनाओं को जागृत कर पाना।

५. हिन्दीसाहित्येतिहास के संक्षिप्त अध्ययन से विविध काल एवं तत्कालीन परिस्थितियों से अवगत होना।

६. व्याकरणिक इकाइयों की समझ एवं प्रभावपूर्ण पत्र लेखन का ज्ञान अर्जित कर सकना।

I Year-I Semester

L	T	P	C
4	0	0	3

Urdu Poetry

UNIT – I

1. GHAZAL
MEER – *Raah-e-Daur-e-Ishq me Rootahaikya*
2. NAZM
Nazeer Akbarabadi – *Kaljug*

UNIT – II

1. GHAZAL
GHALIB – *Dard Minnatkash-e-Dawanahua*
2. NAZM
SHIBLI – *Adl-e-Farooqi*

UNIT – III

1. GHAZAL
MOMIN – *Who jo Hum me Tum me Qaraartha*
2. NAZM
IQBAL – *Chaandaur Tare*

UNIT – IV

1. GHAZAL
DAGH DEHLAVI – *Duniya me Aadmi ko Museebat Kahan nahi*
2. NAZM
AKBAR – *Naseehat-e-Akhlaqi*

UNIT – V

1. GHAZAL
JIGAR MURADABADI – *Koi Ye Kehde Gulshan Gulshan*
2. NAZM
FAIZ – *Lauh-o-Qalam*

SUGGESTED READING:

URDU SHAIRY KA FANNI IRTEQA – FARMAN FATEHPOOR
URDU GHAZAL – KAAMIL QURAISHI
URDU SHAIRI KA TANQEEDI MUTA'A – SUMBUL NIGAAR

I Year-I Semester

L	T	P	C
4	0	0	3

SAHITI SOURABHAM (సాహితీ సౌరభం)

- **<u>అభ్యసన లక్ష్యాలు</u>**

యూనిట్ల సంఖ్య 5

పీరియడ్ల సంఖ్య: 60

1. తెలుగు సాహిత్యం యొక్క ప్రాచీనతను, విశిష్టతను గుర్తించడం

ఆదికవి నన్నయ కాలంనాటి భాషా, సంస్కృతులను పరిచయం చేయడం

2. జాషువా కాలంనాటి మతపరిస్థితులు, గబ్బిలం కావ్య విశేషాలు తెలియజేయడం ద్వారా సమాజం పట్ల అవగాహన పెంపొందింపజేయడం

3. సంపన్న కుటుంబాలలోని పరిస్థితులు, ప్రేమ, పరువు వంటివి మనిషిని ఎలా నడిపిస్తాయో అవగాహన కల్పించడం

4. జమీందారీ వ్యవస్థ ఎలా బీటలు వారుతుందో, మన సమాజంలో పెట్టుబడిదారీ బీజాలు ఎలా నాటుకున్నాయో అర్థం చేసుకోవడంతో పాటు మన పల్లెటూళ్లు, మానవ సంబంధాలు, ఆస్తి అంతస్తులు వికృత రూపంలో ఎలా సాక్షాత్కరిస్తాయో తెలియజేయడం

5. జీవిత చరిత్ర ప్రక్రియను, దాని విశిష్టతను పరిచయం చేయడం

6. ప్రాచీన కావ్యభాషలోని వ్యాకరణాంశాలను అధ్యయనం చేయడం

వ్యాకరణాంశాల ద్వారా భాషాసామర్థ్యాన్ని పెంపొందింపజేయడం

<u>పాఠ్య ప్రణాళిక</u>

<u>యూనిట్ -I (ప్రాచీన కవిత్వం)</u>

రాజనీతి – నన్నయ్య - ఆంధ్ర మహాభారతం – సభాపర్వం – ప్రథమాశ్వాసం (26-57 పద్యాలు)

- నన్నయ్య - కవి పరిచయం
- ప్రజాపాలన – నాడు, నేడు
- రాజనీతి - పాఠ్యాంశ ఇతివృత్తం
- రాజనీతి పాఠ్యాంశ సందేశం

<u>యూనిట్ -II (ఆధునిక కవిత్వం)</u>

గబ్బిలం - జాషువా - ప్రథమ భాగం (1-40 పద్యాల వరకు)

- గుర్రం జాషువా – కవి పరిచయం, కవితా శైలి
- కావ్య రచనా నేపథ్యం
- పాఠ్యాంశ సందేశం
- గబ్బిలం పాఠ్యాంశ ఇతివృత్తం

<u>యూనిట్ -III (కథానిక)</u>

అలరాస పుట్టిళ్ళు – కళ్యాణ సుందరీ జగన్నాథ్

- రచయిత్రి పరిచయం
- కథా నేపథ్యం, సందేశం
- కథాంశం
- పాత్ర చిత్రణ

<u>యూనిట్ -IV (నవల)</u>

అసమర్థుని జీవయాత్ర - గోపీచంద్

- గోపీచంద్ – రచయిత పరిచయం
- నవల నేపథ్యం
- నవల ఇతివృత్తం, పాత్ర చిత్రణ
- నవలా సందేశం

<u>యూనిట్ -V (జీవిత చరిత్ర)</u>

మూడు వాఙ్మయ శిఖరాలు - తిరుమల రామచంద్ర

- తిరుమల రామచంద్ర – కవిపరిచయం
- నిడదవోలు వేంకట రావు
- వేటూరి ప్రభాకర శాస్త్రి
- మానవల్లి రామకృష్ణ కవి

<u>వ్యాకరణం</u>

సంధులు: అత్వ, ఇత్వ, ఉత్వ, త్రిక, సరళాదేశ, గసడదవాదేశ, ద్విరుక్త టకార, సవర్ణ దీర్ఘ, గుణ, యణాదేశ, వృద్ధి సంధులు.

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

అర్థాలంకారాలు : ఉపమ, ఉత్ప్రేక్ష, రూపక, స్వభావోక్తి, అర్థాంతర వ్యాస, అతిశయోక్తి, శ్లేష.

శబ్దాలంకారాలు: వృత్యనుప్రాస, ఛేకానుప్రాస, లాటానుప్రాస, అంత్యానుప్రాస

వృత్తాలు: ఉత్పలమాల, చంపకమాల, శార్దూలము, మత్తేభము

జాతులు : కందం, ద్విపద

ఉపజాతులు : ఆటవెలది, తేటగీతి, సీసం

ముత్యాలసరాలు

- **<u>ఆధార గ్రంథాలు:</u>**

1. శ్రీమదాంధ్ర మహాభారతము - సభాపర్వము- తిరుమల తిరుపతి దేవస్థానం ప్రచురణ
2. గబ్బిలం - జాషువా
3. అలరాస పుట్టిళ్లు - కళ్యాణ సుందరీ జగన్నాథ్
4. అసమర్థుని జీవయాత్ర - త్రిపురనేని గోపీచంద్
5. మూడు వాఙ్మయ శిఖరాలు - తిరుమల రామచంద్ర

- **<u>సూచించబడిన సహపాఠ్య కార్యక్రమాలు:</u>**

1. నన్నయ్య, తిక్కన, ఎఱ్ఱన మొదలైన ప్రసిద్ధ కవుల పాఠ్యాంశేతర పద్యాలను ఇచ్చి, విద్యార్థులచేత సమీక్షలు రాయించడం; ఆయా పద్యాల్లోని యతిప్రాసాది ఛందోవిశేషాలను గుర్తింపజేయడం.

2. విద్యార్థులచేత పాఠ్యాంశాలకు సంబంధించిన వ్యాసాలు రాయించడం (సెమినార్/అసైన్మెంట్)
3. ప్రాచీన పాఠ్యాంశాలలోని సమకాలీనతను గూర్చిన బృంద చర్చ, ప్రాచీన సాహిత్యాన్ని నేటి సామాజిక దృష్టితో పునర్మూల్యాంకనం చేయించడం.
4. చారిత్రిక, సాంస్కృతిక అంశాలకు సంబంధించిన పర్యాటక ప్రదేశాలను సందర్శించడం.
5. వ్యక్తిగత/బృంద ప్రాజెక్టులు చేయించడం.

- **<u>అభ్యసన ఫలితాలు</u>**

ఈ కోర్సు విజయవంతంగా ముగించాక, విద్యార్థులు క్రింది అభ్యసన ఫలితాలను పొందగలరు.

1. తెలుగు సాహిత్యం యొక్క ప్రాచీనతను, విశిష్టతను గుర్తిస్తారు. ఆదికవి నన్నయ కాలంనాటి భాషాసంస్కృతులను, ఇతిహాసకాలం నాటి రాజనీతి విషయాలపట్ల పరిజ్ఞానాన్ని సంపాదించగలరు. ప్రాచీన కావ్యభాషలోని వ్యాకరణాంశాలను అధ్యయనం చేయడం ద్వారా భాషాసామర్థ్యాన్ని, రచనలు మెళకువలను గ్రహించగలరు.
2. జాషువా కాలంనాటి మతపరిస్థితులను, గబ్బిలం కావ్య విశేషాలను గ్రహిస్తారు. తెలుగు నుడికారం, సామెతలు, లోకోక్తులు మొదలైన భాషాంశాల పట్ల పరిజ్ఞానాన్ని పొందగలరు.
3. అలరాస పుట్టిళ్లు కథా నేపథ్యాన్ని, సంపన్న కుటుంబాలలోని పరిస్థితులను, ప్రేమ, పరువు వంటివి మనిషిని ఎలా నడిపిస్తాయో అవగాహన చేసుకోవడంతో పాటు కథా రచన ఎలా చేయాలో తెలుసుకుంటారు.
4. అసమర్థుని జీవయాత్ర రచనలో అప్పటి మన పల్లెటూళ్లు, మానవ సంబంధాలు, ఆస్తి అంతస్తులు వికృత రూపంలో ఎలా సాక్షాత్కరిస్తాయో, జమీందారీ వ్యవస్థ ఎలా బీటలు వారుతుందో, మన సమాజంలో పెట్టుబడిదారీ బీజాలు ఎలా నాటుకున్నాయో విద్యార్థి తెలుసుకుంటాడు. ఒక తరం జీవితాన్ని కళ్లకు కట్టే మనోవైజ్ఞానిక నవలగా పేరు పొందిన అసమర్థుని జీవయాత్ర విద్యార్థి వ్యక్తిత్వ వికాసానికి దోహదం చేస్తుంది.
5. వేటూరి ప్రభాకర శాస్త్రి, నిడదవోలు వేంకటరావు, మానవల్లి రామకృష్ణ కవి వంటి ప్రముఖుల జీవిత చరిత్రలను తిరుమల రామచంద్ర ఎలా రాశారో అధ్యయనం చేయడంతోపాటు జీవిత చరిత్ర ప్రక్రియను ఎలా రచించాలో తెలుసుకుంటారు.
6. ప్రాచీన కావ్యభాషలోని వ్యాకరణాంశాలను అధ్యయనం చేయడం ద్వారా భాషాసామర్థ్యం పెంపొందుతుంది.

I Year-I Semester

L	T	P	C
4	0	0	3

Poetry, Prose & Grammar -I

I Learning Outcomes:

1. प्राचीन संस्कृतसाहित्य स्वरूप परिज्ञानम् भवति ।
2. आधुनिक संस्कृतसाहित्य स्वरूप परिज्ञानम् भवति।
3. मौलिक व्याकरण परिचयः भवति।

II Syllabus: (Teaching Hours: 45)

Unit - 1: प्राचीन पद्य साहित्यम् **(9h)**

1. धनुर्भङ्गः - श्रीमद्रामायणे बालकाण्डे 67 सर्गः
2. शरणागतरक्षणम् - श्रीमहाभारते अनुशासनपर्वणि 32 अध्यायः

.Unit - 2: आधुनिक पद्य साहित्यम् **(9h)**

1. महोदयः - मुळ्ळपूडि नारयणशास्त्रिणः पुत्रसंजीवन काव्ये 2 सर्गः
2. रामकीर्तिः - सत्यव्रतशास्त्रिणः श्रीरामकीर्ति महाकाव्ये 1 सर्गः

Unit - 3: गद्य साहित्यम् **(9h)**

1. खलोक्तिः - हितोपदेशे सन्धि परिच्छेदात्
2. लोकमान्यः - श्रीरामनाथशास्त्रिकृतः निबन्धः

Unit - 4: व्याकरणम् **(9h)**

1. अजन्त शब्दाः (देव, कवि, भानु, धातृ, पितृ, गो, रमा, मति)
2. धातवः (भू, गम्, स्था, दृशिर्, लाभ्, मुद्, अस्, भाष्)

Unit - 5: व्याकरणम् **(9h)**

1. सन्धयः (अच् - हल् सन्धयः)
2. समासाः (द्वन्द्व, तत्पुरुष, कर्मधारय, द्विगु)

III Skill Outcomes:
On successful completion of this course, student shall be able to:

1. साहित्यकार, ऋषि, कवि हृदय विवेचनम् भवति ।
2. मानवीयमूल्यसम्पदनाभिलाषः भवति ।
3. मौलिकव्याकरणज्ञानेन प्रयोगे अर्थात् पठन लेखन वेलासु भाषाशुद्ध्यै प्रयत्नः भवति ।

IV References:

1. Prescribed Sanskrit **Text Book I**

V Co-Curricular Activities: (Hours for Activity: 15h)

1. Assignments
2. Seminars, Group discussions, Quiz, Debates etc.
3. Invited lectures and presentations on related topics by experts.

I Year-I Semester

L	T	P	C
4	0	0	4

FUNDAMENTALS OF COMMERCE

Learning Objectives:

The objective of this paper is to help students to acquire conceptual knowledge of the Commerce, Economy and Role of Commerce in Economic Development. To acquire Knowledge on Accounting and Taxation.

Learning Outcomes:

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

Identify the role commerce in Economic Development and Societal Development. Equip with the knowledge of imports and exports and Balance of Payments. Develop the skill of accounting and accounting principles. They acquire knowledge on micro and micro economics and factors determine demand and supply. An idea of Indian Tax system and various taxes levied on in India. They will acquire skills on web design and digital marketing.

Unit 1: Introduction: Definition of Commerce – Role of Commerce in Economic Development - Role Commerce in Societal Development. Imports and Exports, Balance of Payments. World Trade Organization.

Unit 2: Economic Theory: Macro Economics – Meaning, Definition, Measurements of National Income, Concepts of National Income. Micro Economics – Demand and Supply. Elasticity of Demand and Supply. Classification of Markets -Perfect Competition – Characteristics – Equilibrium Price, Marginal Utility.

Unit 3: Accounting Principles: Meaning and Objectives Accounting, Accounting Cycle - Branches of Accounting - Financial Accounting, Cost Accounting, Management Accounting. Concepts and Conventions of Accounting – GAAP.

Unit 4: Taxation: Meaning of Tax, Taxation - Types of Tax- Income Tax, Corporate Taxation, GST, Customs & Exercise. Differences between Direct and Indirect Tax – Objectives of Tax- Concerned authorities – Central Board of Direct Taxes (CBDT) and Central Board of Excise and Customs (CBIC).

Unit 5: Computer Essentials: Web Design - Word Press Basics, Developing a Simple Website. Digital

Marketing - Social Media Marketing, Content Marketing, Search Engine Optimization (SEO), E-mail Marketing. Data Analytics- Prediction of customer behavior, customized suggestions.

Lab Exercise:

- Build a sample website to display product information.
- Provide wide publicity for your product over social media and e-mail
- Estimate the customer behavior and provide necessary suggestions regarding the products of his interest.

Activities:

- Assignment on GAAP.
- Group Activates on Problem solving.
- Collect date and report the role of Commerce in Economic Development.
- Analyze the demand and supply of a product and make a scheduled based on your analysis, problems on elasticity of demand.
- Identify the Tax and distinguish between Direct Tax and Indirect Tax.
- Assignments and students seminars on Demand function and demand curves
- Quiz Programs
- Assignment on different types of taxes which generate revenue to the Government of India.
- Invited lectures on GST and Taxation system
- Problem Solving Exercises on current economy situation.
- Co-operative learning on Accounting Principles.
- Group Discussions on problems relating to topics covered by syllabus
- Examinations (Scheduled and surprise tests)
- Any similar activities with imaginative thinking beyond the prescribed syllabus

Reference Books:

1. S.P. Jain & K.L Narang, Accountancy - I Kalyani Publishers.
2. R.L. Gupta & V.K. Gupta, Principles and Practice of Accounting, Sultan Chand
3. Business Economics -S.Sankaran, Margham Publications, Chennai.
4. Business Economics - Kalyani Publications.
5. Dr. Vinod K. Singhania: Direct Taxes – Law and Practice, Taxmann Publications.
6. Dr. Mehrotra and Dr. Goyal: Direct Taxes – Law and Practice, SahityaBhavan Publications

I Year-I Semester

L	T	P	C
4	0	0	4

BUSINESS ORGANIZATION

Learning Objectives:

The course aims to acquire conceptual knowledge of business, formation various business organizations. To provide the knowledge on deciding plant location, plan layout and business combinations.

Learning outcomes:

After completing this course a student will have:

- Able to understand the concept of Business Organization along with the basic laws and norms of Business Organization.
- Able to understand the terminologies associated with the field of Business Organization along with their relevance and to identify the appropriate types and functioning of Business Organization for solving different problems.
- The application of Business Organization principles to solve business and industry related problems and to understand the concept of Sole Proprietorship, Partnership and Joint Stock Company etc.

UNIT-I:

Business: Concept, Meaning, Features, Stages of development of business and importance of business, Classification of Business Activities, Meaning, Characteristics, Importance and Objectives of Business Organization, Difference between Industry & Commerce and Business & Profession, Modern Business and their Characteristics.

UNIT-II:

Promotion of Business: Considerations in Establishing New Business, Qualities of a Successful Businessman, Forms of Business Organization - Sole Proprietorship, Partnership, Joint Stock Companies & Co-operatives and their Characteristics, relative merits and demerits, Difference between Private and Public Company, Concept of One Person Company.

UNIT-III:

Plant Location and Layout: Meaning, Importance, Factors affecting Plant Location, Plant Layout -

Meaning, Objectives, Importance, Types of Layout, Factors affecting Layout, Size of Business Unit - Criteria for Measuring the Size and Factors affecting the Size, Optimum Size and factors determining the Optimum Size.

UNIT-IV:

Business Combination: Meaning, Characteristics, Objectives, Causes, Forms and Kinds of Business Combination. Rationalization: Meaning, Characteristics, Objectives, Principles, Merits and demerits, Difference between Rationalization and Nationalization.

UNIT-V:

Computer Essentials: Milestones of Computer Evolution – Computer, Block diagram, generations of computer, Internet Basics - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications. Ethical and Social Implications - Network and security concepts- Information Assurance Fundamentals, Cryptography - Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques, privacy and data protection

Activities:

- Assignment on business organizations and modern business.
- Group Discussion on factors that influence plan location
- Seminars on different topics related to Business organization
- Case study could be given to present business plan of students choice.
- Identifying the attributes of network (Topology, service provider, IP address and bandwidth of your college network) and prepare a report covering network architecture.
- Identify the types of malwares and required firewalls to provide security.
- Latest Fraud techniques used by hackers.

Reference Books:

1. Gupta, C.B., “Business Organisation”, Mayur Publiction, (2014).
2. Singh, B.P., Chhabra, T.N., “An Introduction to Business Organisation & Management”, Kitab Mahal, (2014).
3. Sherlekar, S.A. &Sherlekar, V.S, “Modern Business Organization & Management Systems Approach Mumbai”, Himalaya Publishing House, (2000).
4. Bhusan Y. K., “Business Organization”, Sultan Chand & Sons.
5. Prakash, Jagdish, “Business Organistaton and Management”, Kitab Mahal Publishers (Hindi and English)

6. Fundamentals of Computers by V. Raja Raman
7. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

I Year-I Semester

L	T	P	C
2	0	0	2

ENTREPRENEURSHIP DEVELOPMENT

(Skill Course)

Course Objective:

A Generic Course that is intended to inculcate an integrated personal Life Skill to the student.

Learning Outcomes:

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

- Understand the concept of Entrepreneurship, its applications and scope.
- Know various types of financial institutions that help the business at Central, State and Local Level
- Understand Central and State Government policies, Aware of various tax incentives, concessions
- Applies the knowledge for generating a broad idea for a starting an enterprise/start up
- Understand the content for preparing a Project Report for a startup and differentiate between financial, technical analysis and business feasibility.

Syllabus:

UNIT-I:

Entrepreneurship: Definition and Concept of entrepreneurship – Entrepreneur Characteristics – Classification of Entrepreneurs –Role of Entrepreneurship in Economic Development –Startups.

UNIT-II:

Idea Generation and Project Formulation: Ideas in Entrepreneurships –Sources of New Ideas – Techniques for Generating Ideas – Preparation of Project Report–Contents; Guidelines for Report preparation – Project Appraisal Techniques –Economic Analysis-Financial Analysis-Market Analysis.

UNIT-III:

Institutions Supporting and Taxation Benefits: Central level Institutions: NABARD; SIDBI, – State Level Institutions –DICs – SFC - Government Policy for MSMEs -Tax Incentives and Concessions.

Reference Books:

1. Arya Kumar, Entrepreneurship, Pearson, Delhi
2. Poornima MCH, Entrepreneurship Development –Small Business Enterprises, Pearson, Delhi

3. Sangeetha Sharma, Entrepreneurship Development, PHI Learning
4. Kanishka Bedi, Management and Entrepreneurship, Oxford University Press, Delhi
5. Anil Kumar, S., ET.al., Entrepreneurship Development, New Age International Publishers, NewDelhi
6. Khanka, SS, Entrepreneurship Development, S. Chand, New Delhi
7. Peter F. Drucker, Innovation and Entrepreneurship
8. A. Sahay, M. S. Chhikara, New Vistas of Entrepreneurship: Challenges &Opportunities
9. Dr. B E V L Naidu, Entrepreneurship. Seven Hills Publishers

Suggested Co-Curricular Activities (As far as possible)

1. Group Discussion
2. Debate
3. Seminar
4. Visit to an SSI and preparing of an outline Report
5. Invited Lecture by a Bank Employee on the Bank Support to a Start Up.
6. Chart showing tax concessions to SSI, MSME both direct and indirect.

I Year-I Semester

L	T	P	C
2	0	0	2

LEADERSHIP SKILLS

(Skill Course)

Learning Outcomes:

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

- Develop comprehensive understanding of personality
- Know how to assess and enhance one's own personality
- Comprehend leadership qualities and their importance
- Understand how to develop leadership qualities

Syllabus:

UNIT – I:

Meaning of Personality – Explanations of Human Personality – Psychodynamic Explanations – Social Cognitive Explanation – Big Five traits of Personality

UNIT – II:

Assessment of Personality - Projective& Self Report Techniques - Building SelfConfidence – Enhancing Personality Skills

UNIT – III:

Leadership Characteristics – Types of Leaders – Importance of Leadership – Leadership Skills – Building and Leading Efficient Teams – Leadership Qualities of Abraham Lincoln, mahatma Gandhi, Prakasam Pantulu, Dr. B. R. Ambedkar & J.R.D.Tata

Co-curricular Activities Suggested:

1. Assignments, Group discussions, Quiz etc.,
2. Invited Lecture by a local expert
3. Case Studies (ex., on students behavior, local leaders etc.)

Reference Books:

1. Girish Batra, Experiments in Leadership, Chennai: Notion Press, 2018
2. Mitesh Khatri, Awaken the Leader in You, Mumbai: Jaico Publishing House, 2013
3. Carnegie Dale, Become an Effective Leader, New Delhi: Amaryllis, 2012
4. Hall, C.S., Lindzey. G. & Campbell, J.B Theories of Personality. John Wiley & Sons,1998

I Year-I Semester

L	T	P	C
2	0	0	2

ANALYTICAL SKILLS

(Skill Course)

Course Objective:

Intended to inculcate quantitative analytical skills and reasoning as an inherent ability 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 ability inside and outside the campus.

UNIT – I:

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

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

UNIT – II:

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

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

UNIT – III:

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

Recommended Co-Curricular Activities

- Surprise tests / Viva-Voice / Problem solving/Group discussion.

Text Book:

1. Quantitative Aptitude for Competitive Examination by R.S. Agrawal, S.Chand Publications.

Reference Books:

1. Analytical skills by Showick Thorpe, published by S Chand And Company Limited, Ramnagar, New Delhi-110055
2. Quantitative Aptitude and Reasoning by R V Praveen, PHI publishers.
3. Quantitative Aptitude for Competitive Examination by Abhijit Guha, Tata Mc Graw Hill Publications.

I Year-I Semester

L	T	P	C
2	0	0	2

COMMUNICATION SKILLS

(Skill Course)

Course Objectives & Outcomes:

- Upon the completion of the course the students will be able to:
- Understand the nature importance of communication.
- Learn the process involved in communication.
- Develop interview skills.
- Acquire presentation skills.
- Effectively play their roles in group discussions.
- Enhance the skills of public speaking.

UNIT-I: BASICS OF COMMUNICATION

1. Nature and importance of communication
2. Process of Communication
3. Principles of communication
4. Barriers to effective communication
5. Strategies for effective communication

UNIT-II: PRESENTATION SKILLS

1. Preparation of a good presentation
2. Verbal communication in presentation
3. Non-verbal communication in presentation
4. Visual aids/Materials in presentation
5. Analyzing audience and managing questions

UNIT- III: INTERVIEWS AND GROUP DISCUSSIONS

1. Interview and its types
2. Before, during and after an interview
3. Do’s and Don’ts in an interview
4. Basic Interview questions

5. Structure and process of Group Discussions
6. Role functions, Do's and Don'ts

Recommended Activities:

1. Presenting seminar papers.
2. Mock interviews.
3. Using Power point presentations in seminars.

References:

1. Working in English, Jones, Cambridge
2. Business Communication, Raman –Prakash, Oxford
3. Speaking Personally, Porter-Ladousse, Cambridge
4. Speaking Effectively, Jermy Comfort, et.al, Cambridge
5. Anjanee Sethi & Bhavana Adhikari, Business Communication, Tata McGraw Hill
6. Jermy Comfort, Speaking Effectively, et.al, Cambridge

I Year-I Semester

L	T	P	C
2	0	0	2

INTRODUCTION TO SOCIAL WORK

(Multidisciplinary Course)

Learning Outcomes:

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

- Understand the basic concepts relating to social work practice, values, principles of social work and social problems in India
- List out different approaches of providing help to the people in need.
- Acquaint the process of primary methods of social work
- Get to know the skills of working with individuals, groups and communities.

Syllabus

UNIT-I:(07Hrs)-

Introduction to social work and concepts related to social work Introduction to Social Work- Definition- Scope- objectives - Functions- social service, social welfare services, social reform, major social problems in India; Social work philosophy, values, objectives, principles, methods and fields of social work.

UNIT-II:(09Hrs)-

Methods of Working with Individuals and Groups Social case work –Definition-scope and importance of social case work, principles and process of social case work -Tools and techniques in social case work- Counselling skills.

Social Group Work-Definition-scope- the need for social group work –Group work process - Principles of Group Work -Stages of Group Work-Facilitation skills and techniques.

UNIT-III: (09Hrs) -

Working with Communities and Field Work in social work Community – definition - characteristics- types- community organisation as a method of social work-definition-objectives-principles- phases of community organization - concepts of community development, community participation and community empowerment. Field work in social work – Nature, objectives and types of field work - Importance of field work supervision.

Suggested Co-curricular Activities: (05 hours)

- Divide the students into groups, each group containing not exceeding 10 students depending upon the total number of students in a class or section. Each group can search in internet about any one of the institutions which work for the welfare of children or women or elderly or scheduled caste and scheduled tribe children or differently abled persons or Juvenile homes or Correctional homes or hospitals or Mahila Pragathi pranganam or Swadhar project or any social welfare project or non-governmental organizations (NGOs) to have an idea about welfare agencies working for the needy.
- Ask each group to exchange and discuss the information with other groups in the classroom with the information they collected on Internet.
- Group Discussion with the students- what type of community problems they observe in their villages/towns/cities? Ask them to tell what are the line departments which will help to solve the problems of their communities and suggest them what type strategies help the communities to empower.
- Invited lectures/Training by local experts
- Visit to a community
- Assignments, Quiz etc.

References:

1. Chowdhary, Paul. D. (1992). Introduction to Social Work. New Delhi: Atma Ram and Sons.
2. Friedlander W.A. (1955). Introduction to social welfare, New York, Prentice Hall.
3. Government of India, (1987). Encyclopedia of Social Work in India (Set of 4 Volumes), New Delhi, Publications Division, Ministry of Information and Broadcasting.
4. Lal Das, D.K. (2017). Practice of Social Research – Social Work Perspective, Jaipur, Rawat Publications.
5. Madan, G.R. (2009). Indian Social Problems (Volume 1 & 2). New Delhi: Allied publishers Private Limited.
6. Siddiqui, H.Y.(2007). Social Group Work. Jaipur: Rawat Publications
7. Pasty McCarthy & Carolin Hatcher, (2002). Presentation skills. The Essential Guide for Students. New Delhi, Sage Publications.
8. Websites on Social work methods.

I Year-I Semester

L	T	P	C
2	0	0	2

PRINCIPLES OF PSYCHOLOGY

(Multidisciplinary Course)

UNIT I:

Introduction: Definition, Origin of psychology, Psychology as a scientific study of behavior, applied fields of psychology Biological bases of behavior Sensory and perceptual processes: Structure and function of visual and auditory senses; Attention: selective, sustained and divided attention. Perception: Nature and determinants; Perceptual constancies

UNIT II:

Emotion and Motivation: Nature of emotion; components of emotions. Theories of emotion: James-Lange, Cannon-Bard and Schachter-Singer. Motivation: Nature and types; Maslow's hierarchy model

UNIT III:

Individual differences: Learning and memory: Learning – Definition, Classical and instrumental conditioning: principles of classical conditioning, schedules of reinforcement, Memory - Sensory, short-term and long-term memory; forgetting and its causes

Personality - Trait and type approaches; assessment of personality. Intelligence: Concept of IQ and measurement

Books recommended:

1. Baron, R. A. (2006). Psychology (5th Ed.). New Delhi: Pearson Education.
2. Ciccarelli, S. K., & Meyer, G. E. (2009). Psychology. Delhi: Pearson Education.
3. Coon, D., & Mitterer, J. O. (2007). Introduction to Psychology: Gateway to mind and behaviour. New Delhi:Cengage.
4. Gerrig, R. J., & Zimbardo, P. G. (2006). Psychology and Life (17th Ed.). New Delhi: Pearson Education.
5. Singh, A. K. (2009). Uchachtar Samanya Manovigyan. Varanasi: Motilal Banarasi Das.

L	T	P	C
2	0	0	2

INDIAN HISTORY

(Multidisciplinary Course)

Learning Outcomes:

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

- Students will have an overall understanding of Indian history and culture from ancient to modern India.
- Learn about the changes in society, economy, politics, and culture under various dynasties. Know mediaeval Indian history and culture.
- Understand the greatness of the Mughals and their administration.
- Visualise how the Europeans are settled and how the colonials introduce various economic policies and their impacts.
- Know the stages of the Indian Freedom Struggle and the roles of Gandhi and Subash Chandra Bose.

Syllabus:

UNIT-I:

Ancient Indian History and Culture: What is History-Evolution of Man-Science and Technology in Harappan Civilisation-Vedic Literature- Difference between Jainism and Buddhism Philosophy-Ashoka Dhamma Policy-Science and Technology in Guptha Period- Chronology of Various Dynasties that ruled India (6th Century BC to 1206 CE)

UNIT-II:

History and Culture of Medieval India: Delhi Sultanate: Rulers (Brief), Alla-Ud-Din-Khilji and Muhammad-Bin-Tuglaq Reforms-Greater Mughals (Brief)-Mughal Administration-Akbar Religious Policy-Mughal Art and Architecture-Bhakti Saints

UNIT-III:

History of Modern India: European Settlements-British Revenue Policies-Economic Impact of British Rule-Socio-Religious Reform Movements-Causes for 1857 Revolt-Indian Freedom Struggle: Vandemataram, Home Rule Movement-Gandhi's Role: Non-Cooperation Movements, Salt Satya Graha and Quit India Movement-Subash Chandra Bose-Partition of India.

Curricular Activities:

- Map-pointing/Collection of Historical newspaper cuttings.
- Prepare a chart on Ancient, Medieval Dynasties and their rulers.
- Collect the various National Leaders photographs
- Prepare a list of Historical events in chronological order
- Unit Tests/Quiz/Debates/Workshops/Book Reviews/Seminars/Assignments.
- Collection of Articles and Books/Preparation of Videos/Charts
- Photos Exhibitions on Historical Importance/Visit to the Museums

References:

1. E.H. Carr., What is History, Penguin, 1961
2. R.S.Sharma., Ancient India, New Delhi, 1996
3. D.N.Jha, Ancient India: In Historical Outline, Manohar Publishers, 1999.
4. R.C.Majumdar, K.K.Dutta &H.C.Roy Chowdhuri (ed.), An Advanced History of India, Macmillan, 1948.
5. Romila Thapar., Early India: From the origins to 1300, University of California Press, 2004.
6. Ranabir Chakravarthi., Exploring Early India, upto 1300 A.D, Primus Books, 2016.
7. Satish Chandra., History of Medieval India, 800-1700, Oriental Blackswan, 2007.
8. Satish Chandra., Medieval India: From Sultanate to the Mughals, Part-I & II, Har Anand Publications, 2005.
9. I.H.Qureshi., The Administration of the Sultanate of Delhi, Oriental Books, 1977.
10. Harbans Mukhia., The Mughals of India, Wiley Publishers, 2008.
11. JhanF.Richards., The Mughal Empire, All Volumes, Cambridge University Press, 2012.
12. Sumit Sarkar., Modern India, Pearson India, 2014.
13. Śekhara Bandyopādhyāẏa.,From Plessey to Partition: A History of Modern India, Oriental Blakswan, 2004
14. V.D.Mahajan., Modern Indian History, S.Chand and Company Limited, 2020.
15. Bipan Chnadra, A.Tripathi, Barunde., Freedom Struggle, National Book Trust, 1987.
16. R.C.Dutt., The Economic History of India Under Early British Rule, K.Paul, Trench, Trubner& Company Limited, 2008.
17. Tirthankar Roy., How British Rule Changed India’s Economy: The Paradox of the Raj, Springer International Publishing, 2020.
18. S.N.Sen., An Advanced History of Modern India, Macmillan India, 2010.
19. Ishita Banerjee-Dube., A History of Modern India, Cambridge University Press, 2015

I Year-I Semester

L	T	P	C
2	0	0	2

PRINCIPLES OF BIOLOGICAL SCIENCES

(Multidisciplinary Course)

Learning Objectives:

By the end of this course the learner can:

1. Acquire logic to evaluate fundamental biological concepts at various levels of biological organization including the molecular, cellular, organismal and systems levels.
2. Communicate fundamental biological knowledge between tiers of biological organization.
3. Apply common biological principles across all levels of biological organization.

Learning Outcomes:

On completion of this course students will be able to:

1. Understand the relationship between structure and function at all levels.
2. Recognize the mechanisms underlying biological evolution, its patterns, and its significance as biology's overarching unifying principle.
3. Understand the contributions of biology to the resolution of medical, ethical, social, and environmental concerns in human affairs.

UNIT-I: Diversity of Life

- Introduction to Biology, Branches of Biology, Basic Principles of Biology
- Biological Classification-Two kingdom and Five kingdom classification, Viruses, Viroid’s and Lichens
- Diversity in the living world, Taxonomic categories, Taxonomic aids
- Plant organization-The form, structure and function of plant vegetative and reproductive organs, Classification of Plant Kingdom,
- Basis of Animal Classification, Classification of Animal Kingdom

UNIT-II: Biomolecules and metabolism

- Ultra structure of cell and Cell organelles (Structure and Functions), Plant cell vs Animal cell
- Plant Physiology: Photosynthesis, Respiration, Transportation, Mechanisms of Nitrogen fixation.
- Plant growth and development, physiology of flowering.
- Human Physiology: Digestion, Respiration, Circulation
- Male and female reproductive organs, gametogenesis, fertilization.

UNIT-III: Principles of Biology

- Genetics: Mendel's laws of inheritance, Genetic disorders- Colour blindness, Sickle cell anemia.
- Evolution: Geological time scale for evolution of plants and vertebrates, Origin and evolution of plants and man
- Common Human Diseases: causing organism, prevention and treatment- malaria, dengue, AIDS, cancer, corona.
- Common Plant Diseases: causing organism, prevention and treatment- Black spot, Leaf spots, Powdery mildew, Blight, Canker.
- Biotechnology: Tools and process of recombinant DNA technology, Applications of biotechnology in agriculture, food industry, medicine and transgenic animals.

Text Books

1. Pandey, B.P. (2013) College Botany, Volume-I, S. Chand Publishing, New Delhi.
2. Kotpal, R.L.2022. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut).
3. Verma P.S., Agarwal V.K., 2006, Cell biology, genetics, Molecular Biology, Evolution and Ecology, S. Chand publishers, New Delhi, India.

Reference Books

1. Sreekrishna V. 2005. Biotechnology –I, Cell Biology and Genetics. New Age International Publ. New Delhi, India.
2. Rastogi, S.C., 2019. Essentials of animal physiology. 4th Edition. New Age International Publishers.

I Year-I Semester

L	T	P	C
2	0	0	2

PRINCIPLES OF CHEMICAL SCIENCES

(Multidisciplinary Course)

Course Outcomes:

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

- Understand the structure of atom.
- Identify the isotopes and isobars.
- Define acids and bases and predict the nature of salts.
- Explain ionic and covalent bonding.
- Describe the importance of Chemistry in daily life.

Syllabus:

UNIT I: Matter, Atoms, Molecules & Nuclear Chemistry

Classification of matter, Dalton atomic theory, Thomson Model, Rutherford Model, Bohr's model of atom, quantum numbers, electronic configuration, Aufbau Principle, Pauli's exclusion principle, Hund's rule. Isotopes-Isobars, Nuclear decay, Band of Stability, Nuclear Reaction types, Nuclear Applications.

UNIT II: Elements, Classification and Chemical Bonding

Classification of elements, Periodic Classification of elements based on electronic configuration, classification into types, classification into metals, non-metals and metalloids, periodic properties atomic radii, ionisation enthalpy, electronegativity, Octet rule, ionic bond properties of Ionic compounds-covalent bond, properties of covalent molecule.

UNIT III: Acids, Bases, Salts, Chemistry in Daily life

Definition, types and properties of Acids, Bases, Salts, strength of acids and bases, pH, Importance of Chemistry in daily life. (food, drugs, textiles, preservatives, soaps and detergents.)

Reference Books:

1. Inorganic Chemistry by Puri and Sharma
2. Basic concepts of Inorganic Chemistry by D.N.Singh

Co-curricular activities:

- Projects on Importance of Chemistry in food, drugs, textiles, preservatives, soaps and detergents.

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PRINCIPLES OF PHYSICAL SCIENCES

(Multidisciplinary Course)

Course Objective:

The course "Principles of Physical Sciences" is designed to introduce arts students to fundamental concepts and principles of physical sciences, fostering a deeper understanding of the physical world and its interconnections with various disciplines.

Learning outcomes:

Upon completion of the course Students will be able to:

- Understand the foundational principles of physical sciences: Students will develop a comprehensive understanding of the core principles and concepts in physical sciences.
- Analyse and interpret scientific information: Students will acquire the ability to critically analyse scientific information and data related to physical sciences.
- Apply physical science principles to real-world scenarios: Students will develop the skills to apply physical science principles to solve real-world problems and scenarios.

Syllabus:

UNIT-I: Introduction to Physics

Nature of Physics: Overview of physics as a discipline, its scope, and its relationship to other sciences. Scientific Method in Physics: Introduction to the scientific method and its application in the study of physics. Measurement and Units: Understanding the principles of measurement, SI units, and the importance of accurate and precise measurements.

Scalars and Vectors: Differentiating between scalars and vectors, understanding vector addition and subtraction.

UNIT-II:

Motion and Forces: Introduction to the principles of motion, including velocity, acceleration, and the laws of motion. Energy and Work: Understanding the concept of energy, different forms of energy, and the relationship between work and energy. Circular Motion: Exploring the principles of circular motion, centripetal force, and applications in real-world scenarios. Gravity: Introduction to the concept of gravity, Newton's law of universal gravitation, and its implications.

UNIT-III:

Waves: Understanding the properties and characteristics of waves, including wave types, wave motion, and wave interference. Sound Waves: Exploring the nature of sound waves, including properties of sound, sound propagation, and the Doppler effect. Light and Optics: Introduction to the behavior of light, reflection, refraction, and the formation of images by mirrors and lenses.

Wave Optics: Understanding the principles of interference, diffraction, and polarization of light waves.

Reference Books:

1. "Principles of Physics" by David Halliday, Robert Resnick, and Jearl Walker: This textbook covers the fundamental principles of physics, including mechanics, electromagnetism, thermodynamics, and modern physics. It provides a comprehensive introduction to the subject and includes numerous examples and exercises for practice.
2. "University Physics" by Hugh D. Young and Roger A. Freedman: This textbook is widely used in university-level physics courses. It covers a wide range of topics in classical physics, modern physics, and thermodynamics. It is known for its clear explanations and problem-solving approach.
3. "Concepts of Modern Physics" by Arthur Beiser: This book provides an introduction to the principles and concepts of modern physics, including quantum mechanics, atomic and nuclear physics, and relativity. It is suitable for students with a basic background in physics and mathematics.
4. "The Feynman Lectures on Physics" by Richard P. Feynman, Robert B. Leighton, and Matthew Sands: This three-volume set is based on the famous lectures given by physicist Richard Feynman. It covers a wide range of topics in physics, including mechanics, electromagnetism, quantum mechanics, and statistical mechanics. The lectures are known for their engaging style and intuitive explanations.
5. "Physical Science" by Bill Tillery: This textbook provides a comprehensive introduction to the principles of physical science, covering topics such as motion, forces, energy, waves, electricity, and magnetism. It is designed for introductory-level courses and includes numerous examples, illustrations, and practice problems.
6. "Fundamentals of Physics" by Jearl Walker, David Halliday, and Robert Resnick: This textbook is widely used in physics courses and covers the fundamental principles of classical physics. It includes a strong emphasis on problem-solving and conceptual understanding.

Student activities:

1. Conduct research on a famous physicist or a significant discovery in the field of physics. Write a short report highlighting the physicist's contributions or explaining the importance of the discovery. Include information about how the discovery impacted other scientific fields or technological advancements.
2. Watch videos or animations demonstrating circular motion, such as the motion of objects on a Ferris wheel or a car turning on a curved track. Identify the forces involved, including the centripetal force, and explain how they contribute to the object's circular motion. Discuss real-world examples where circular motion is significant, such as satellites orbiting the Earth.
3. Set up a wave demonstration using a rope or a slinky to visualize the properties of waves, such as wavelength, frequency, amplitude, and wave speed. Observe how these properties change when altering the parameters of the wave, such as tension or length.

I Year-II Semester

L	T	P	C
4	0	0	3

A Course in Reading & Writing Skills

Objectives & Outcomes

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

- Use reading skills for effective comprehension.
- Build up a repository of active vocabulary.
- Own writing strategies in academic skills.
- Enable writing skills for future purposes.
- Enhance communicative competence through Reading and Writings skills acquired.

UNIT-I

Poetry: 1. Ulysses Alfred Lord Tennyson

Skills: 2. Vocabulary: Conversion of Words

3. One Word Substitutes

4. Collocations

UNIT-II

Prose: 1. The Best Investment I Ever Made A.J.Cronin

Non-Detailed Text: 2. Florence Nightingale Abrar Mohsin

Skills: 3. Skimming and Scanning

UNIT-III

Prose: 1. TheNight Train at Deoli RuskinBond

Poetry Skills: 2. Stopping by Woods on a Snowy Evening

3. Reading Comprehension (Top Down, Bottom Up and Schema Theory)

4. Note Making/ Taking Robert Frost

UNIT-IV

Poetry: 1. Night of the Scorpion Nissim Ezekiel

Skills: 2. Expansion of Ideas

3. Notices, Agendas and Minutes

UNIT-V

Non-Detailed Text: 1.An Astrologer's Day RK Narayan

Skills: 2. Curriculum Vitae and Resume

3. Letters
4. E-Correspondence

References:

1. Communication Skills (2nd Edition), Sanjay Kumar &PushpLata, Oxford University Press, 2016.
2. The New Oxford Guide to Writing, Thomas, S. Kane,
3. Reading Skills: How to Read Better and Faster- Speed Reading, Reading Comprehension & Accelerated Learning (2nd Edition), Nick Bell.
4. English Vocabulary in Use: Upper Intermediate, Cambridge University Press.

Activities:

- Asking the students to prepare a model resume. Quiz on one word substitutes.
- Collocation pair activity.
- Asking the students to read news clippings and make notes.

I Year-II Semester

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Hindi Padya Sahitya

Units: 5

Periods: 60

लक्ष्य:

१.कबीर और तुलसी के दोहों में व्यक्त सामाजिक संदेश जो आज के समय में भी प्रासंगिक है, विद्यार्थियों को उनसे परिचित कराना। सूर के पदों की लयात्मकता से परिचित हो पाना।

२. आधुनिक काल के प्रमुख हिन्दी कवियों का योगदान एवं विभिन्न साहित्यिक परंपराओं में उनके योगदान का आकलन कर सकेंगे।

३.निबंध के माध्यम से विद्यार्थियों के सामाजिक ज्ञान की वृद्धि होना।

४. प्रयोजन मूलक हिन्दी के अंतर्गत विद्यार्थी विभिन्न सरकारी पत्रों से अवगत हो पाना।

५.अनुवाद और संक्षेपण ऐसी कलाएँ हैं, जिनके अभ्यास से विद्यार्थी भाषाओं पर निपुणता हासिल कर सकेंगे।

Unit - I

प्राचीन कविता

१. कबीर दास - ५ दोहे

२. सूरदास - बाल वर्णन

३. तुलसीदास - ५ दोहे

Unit - II

आधुनिक कविता

१. मातृभाषा - भारतेंदु हरिश्चंद्र - ५ दोहे

२. भिक्षुक - सूर्यकांत त्रिपाठी निराला

३. मादा भ्रूण - रजनी तिलक

Unit - III

सामान्य निबन्ध

१. विद्यार्थी और अनुशासन

२. विश्व भाषा के रूप में हिंदी

३. पर्यावरण प्रदूषण

Unit -IV

प्रयोजन मूलक हिन्दी - परिचय

सरकारी पत्र- परिभाषा एवं पत्र का नमूना

१.परिपत्र

२.ज्ञापन

३.अधिसूचना

Unit - V

१. अनुवाद - अंग्रेजी से हिन्दी(४ - ५ पंक्तियॉ)

तेलुगू से हिन्दी (४ - ५ पंक्तियॉ)

२. संक्षेपण

परिणाम: द्वितीय सत्र के सफल समापन के उपरांत विद्यार्थी निम्न विषयों में सक्षम होंगे।

१.प्राचीन कविता के अध्ययन से विद्यार्थियों में सामाजिक चेतना जागृत होगी, काव्यगत विशेषताओं से परिचित होंगे।

२.आधुनिक काल की विविध प्रक्रियाओं का आकलन तथा विश्लेषण।

३.विभिन्न निबंधों के माध्यम से विद्यार्थियों के सामाजिक ज्ञान की श्रीवृद्धि।

४.प्रयोजन मूलक हिन्दी का ज्ञान प्राप्त कर विद्यार्थी सरकारी तथा गैर सरकारी संगठनों में अनुवादक पद केलिए अपने आप को तैयार कर पायेंगे।

५.अनुवाद अभ्यास जो साहित्यिक एवं अनुप्रयुक्त माध्यम से करवाया जाता है, यह विद्यार्थियों केलिए उपयोगी सिद्ध होगा। संक्षेपण कला के अभ्यास से भाषाई निपुणता प्राप्त कर सकते हैं।

संदर्भ ग्रंथ

१. गद्य संदेश - डॉ नरसिंहम शिवकोटि

२.कथालोक- डॉ घनश्याम

३.काव्य दीप- श्री बी राधाकृष्ण मूर्ति

४. आधुनिक हिन्दी व्याकरण और रचना - डॉ वासुदेव नंदन प्रसाद

I Year-II Semester

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URDU PROSE NON FICTION

UNIT – I GHAIR AFSANAWI ADAB KA TA'ARUF

UNIT – II MAZMOON
Guzra Hua Zamana (Sir Syed)

UNIT – III KHAKA
Nam Dev Maali(Baba-e-Urdu Maulvi Abdul Haq)

UNIT – IV INSHAIYYA
Diyasalaai (Khaja Hasan Nizami)

UNIT – V KHUTOOT-E-GHALIB
1. *Hatim Ali Mehrke Naam*
2. *Meer Mehdi Majroohke Naam*

SUGGESTED READING:

GAIR AFSANAVI URDU NASR – ATIYA RAYEES
INSHAIYA AUR INSHAIYE – SYED MOHAMMED HASNAIN
GHALIB KE KHUTOOT – KHALIQ ANJUM

I Year-I Semester

L	T	P	C
4	0	0	3

సృజనాత్మక రచన

- **అభ్యసన లక్ష్యాలు**

1. తెలుగు సాహిత్య అభ్యసన నైపుణ్యాలను, సృజనాత్మక నైపుణ్యాలుగా మార్చడం

విద్యార్థులు భాషాతత్వాన్ని, భాష యొక్క ఆవశ్యకతను, భాష యొక్క ప్రాధాన్యాన్ని గుర్తింపజేయడం

మనిషి వ్యక్తిగత జీవనానికి, సామాజిక వ్యవస్థ పటిష్టతకు భాష ప్రధానమని తెలుసుకునేలా జేయడం

తెలుగుభాషలోని కీలకాంశాలైన వర్ణం, పదం, వాక్యాల ప్రాధాన్యాన్ని అవగాహన చేసుకోవడం

2. అనువాద రంగంలో నైపుణ్య సంపాదనను కలగజేయడం

3. సృజన రంగం, ప్రసార మాధ్యమ రంగాల్లో ఉపాధి అవకాశాలను అందిపుచ్చుకునేలా జేయడం

4. వ్యాస రచన ఎలా చేయాలో నేర్పించడం

5. సాంకేతికత రంగంలో తెలుగు ప్రాధాన్యతను గుర్తించేలా జేయడం

పాఠ్య ప్రణాళిక

I. వ్యక్తీకరణ నైపుణ్యాలు

భాష- నిర్వచనాలు, లక్షణాలు

భాష- ఆవశ్యకత, ప్రయోజనాలు

భాష – ఉత్పత్తి వాదాలు

వర్ణం - పదం – వాక్యం

II. అనువాద రచన

అనువాదం - నిర్వచనాలు, ఆవశ్యకత

అనువాద పద్ధతులు

అనువాద సమస్యలు - భౌగోళ, భాష, సాంస్కృతిక సమస్యలు.

- అభ్యాసం ఆంగ్లంనుంచి తెలుగుకు, తెలుగు నుంచి ఆంగ్లానికి ఒక ‘పేరా’ అనువాదం చేయడం

III. మాధ్యమాలకు రచన

పత్రికా రచన – వార్తారచన, సంపాదకీయం, సమీక్ష

శ్రవ్య మాధ్యమం – రేడియో రచన (కథ), podcast (డాక్యుమెంటరీ)

దృశ్య మాధ్యమం – టెలివిజన్ (కెమెరా) రచన [రూపకం (Skit), వాఖ్యానం (Anchoring)]

- ముద్రణా మాధ్యమ / శ్రవ్య మాధ్యమ / దృశ్య మాధ్యమ రచన విద్యార్థుల చేత చేయించడం

IV. తెలుగు వ్యాస రచన

తెలుగు వ్యాసం - నిర్వచనాలు, లక్షణాలు

సాక్షి వ్యాసం – స్వభాష

ఉపాధ్యాయ ఉవాచ – మునిమాణిక్యం నరసింహారావు

- విద్యార్థి చేత వ్యాస రచన చేయించడం

V. తెలుగు సాంకేతికత

తెలుగు లిపి పరిచయం - యూనికోడ్

తెలుగు వికిపీడియా

సామాజిక మాధ్యమాల్లో తెలుగు

(' ఇ' పత్రికలు, వెబ్సైట్లు, బ్లాగ్లు)

- తెలుగు వికీపీడియాలో మార్పులు చేర్పులు విద్యార్థుల చేత చేయించడం/
- సామాజిక మాధ్యమాల్లో తెలుగు రచనలు చేయించడం

- **<u>ఆధార గ్రంథాలు/వ్యాసాలు</u>**

1. వ్యక్తీకరణ నైపుణ్యాలు - 1. ఆధునిక భాషాశాస్త్ర సిద్ధాంతాలు - ఆచార్య పి. ఎస్. సుబ్రహ్మణ్యం

   2. తెలుగు భాషా చరిత్ర – (సం.) ఆచార్య భద్రిరాజు కృష్ణమూర్తి

   3. తెలుగు వాక్యం – ఆచార్య చేకూరి రామారావు,

2. ఉత్తమ కవిత-లక్షణాలు - నవ్యకవిత్వ లక్షణములు - ఆచార్య సి. నారాయణరెడ్డి

   ఆధునికాంధ్ర కవిత్వము-సంప్రదాయములు, ప్రయోగములు, చతుర్ధ ప్రకరణము.

3. ఉత్తమ కథ –లక్షణాలు - కథాశిల్పం-వల్లంపాటి వెంకటసుబ్బయ్య, పుటలు 11-17.

4. తెలుగు కథానిక – స్వరూప స్వభావాలు – పోరంకి దక్షిణామూర్తి

5. ఉత్తమ వ్యాసం లక్షణాలు - చదువు - సంస్కృతి (వ్యాసం) - కొడవటిగంటి కుటుంబరావు

6. తెలుగు వ్యాస పరిణామం - ఆచార్య కొలకలూరి ఇనాక్

7. అనువాద రచన - 1. అనువాద సమస్యలు - రాచమల్లు రామచంద్రారెడ్డి (పుటలు 61-75, 85-94)

   2. అనువాదన పద్ధతులు - ఆచరణ సమస్యలు-చేకూరి రామారావు.

   "భాషాంతరంగం", తెలుగు విశ్వవిద్యాలయం ప్రచురణ. (పుటలు 130-146,)

8. ముద్రణా మాధ్యమం - మాధ్యమాలకు రచన (పుటలు 9-12)

   డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ

9. పత్రికా భాష - మాధ్యమాలకు రచన (పుటలు 67-74)

డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ

10. పత్రికా రచన - తెలుగు మౌలికాంశాలు (పుటలు 59-69)

డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ

11. ప్రసార మాధ్యమాలు - మాధ్యమాలకు రచన (పుటలు 3-10)

డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ

12. రేడియో రచన - మాధ్యమాలకు రచన (పుటలు 141-148)

డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ

- చూ. మాధ్యమాలకు రచన (పుటలు 141-148)

13. వ్యాఖ్యానం (యాంకరింగ్) - మాధ్యమాలకు రచన (పుటలు 178-181)

డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ

14. టెలివిజన్ రచన - మాధ్యమాలకు రచన (పుటలు 153 -160)

డా॥ బి.ఆర్. అంబేద్కర్ విశ్వవిద్యాలయ ప్రచురణ

15. తెలుగు జర్నలిజం - డా॥ బూదరాజు రాధాకృష్ణ

సూచించబడిన సహపాఠ్య కార్యక్రమాలు

1. భాషాంశాలపై, వాక్య నిర్మాణంపై అసైన్మెంట్లు రాయించడం, పత్రికల్లోని సాహిత్య/భాషాంశాలను సేకరింపజేయడం.

2. విద్యార్థులచేత తెలుగు భాషా సాహిత్యాలపై ప్రసంగ వ్యాసం ఇప్పించడం (సెమినార్, అసైన్మెంట్)

3. వ్యాసరచన, లేఖారచన, స్వీయ కవితలు రాయించి తరగతిలో చదివింపచేయడం

4. వివిధ కార్యక్రమాల్లో విద్యార్థులచేత సదస్సు నిర్వహణ, వ్యాఖ్యానం (యాంకరింగ్) చేయించడం.

5. సమకాలీన భాషాసమస్యలపై / ఉద్యమాలపై/సాంఘిక సమస్యలపై 'బృందచర్చ' (Group Discussion)

6. తెలుగుభాషా దినోత్సవం/అంతర్జాతీయ మాతృభాషా దినోత్సవం మొదలైన రోజుల్లో జరిగే సాంస్కృతిక కార్యక్రమాలు విద్యార్థులచేత నిర్వహింపజేయడం, వాటిపై సమీక్షలు/పత్రికా ప్రకటనలు రాయించడం.

7. సమకాలీన సంఘటనలపై సామాజిక మాధ్యమాల్లో/ టి.వి.ల్లో జరిగే చర్చలను నమోదు చేసి సంకలనం చేయడం.

8. సాంస్కృతిక / చారిత్రక ప్రాశస్త్యం కలిగిన కట్టడాలు, దేవాలయాలు, కళానిలయాలను 'బృందపర్యటన/ క్షేత్ర పర్యటన' ద్వారా విద్యార్థులచేత సందర్శింపజేయడం.

- **అభ్యసన ఫలితాలు**

ఈ కోర్సు విజయవంతంగా ముగించాక, విద్యార్థులు క్రింది అభ్యసన ఫలితాలను పొందగలరు.

1. తెలుగు సాహిత్య అభ్యాసన ద్వారా నేర్చుకున్న నైపుణ్యాలను, సృజనాత్మక నైపుణ్యాలుగా మార్చుకోగలరు. విద్యార్థులు భాషాతత్వాన్ని, భాష యొక్క ఆవశ్యకతను, భాష యొక్క ప్రాధాన్యాన్ని గుర్తిస్తారు. మనిషి వ్యక్తిగత జీవనానికి, సామాజిక వ్యవస్థ పటిష్టతకు భాష ప్రధానమని తెలుసుకుంటారు. తెలుగుభాషలోని కీలకాంశాలైన వర్ణం, పదం, వాక్యాల ప్రాధాన్యాన్ని గుర్తిస్తూ వాగ్రూప, లిఖితరూప వ్యక్తీకరణ ద్వారా భాషానైపుణ్యాలను మెరుగుపరచుకోగలరు.

2. అనువాద ఆవశ్యకతను తెలుసుకుంటారు. అనువాద రంగంలో నైపుణ్యం పెరుగుతుంది.

3. సృజన రంగం, ప్రసార మాధ్యమ రంగాల్లో ఉపాధి అవకాశాలను అందిపుచ్చుకోగలరు.

4. భాషానైపుణ్యాలను అలవరచుకోవడంతోపాటు వినియోగించడం నేర్చుకుంటారు. భాషణానైపుణ్యాలను సృజనాత్మక రూపంలో వ్యక్తీకరించగలరు. మంచి వ్యాస రచనా నైపుణ్యాలను పెంపొందించుకోగలరు.

5. సాంకేతికత రంగంలో తెలుగు ప్రాధాన్యత గురించి అవగాహన పొందగలరు.

I Year-II Semester

L	T	P	C
4	0	0	3

Poetry, Prose & Grammar -II

I Learning Outcomes:

1. संस्कृत पद्यकविप्रयोग माधुर्यानुभूतिः भवति ।
2. संस्कृत गद्यकविप्रयोग माधुर्यानुभूतिः भवति ।
3. व्याकरणज्ञानात् लेखनशुद्धिः भवति ।

II Syllabus: (Teaching Hours: 45)

Unit - 1: प्राचीन पद्य साहित्यम् **(9h)**

1. पाणिग्रहणम् - रघुवम्शमहाकाव्ये 7 सर्गः
2. पत्रार्चानम् - नानाग्रन्थेभ्यः

.Unit - 2: आधुनिक पद्य साहित्यम् **(9h)**

1. पन्नाधात्री – श्रीमत्प्रतापरणायने मेवाडकाण्डे 13 सर्गः
2. सुखवर्गः – धम्मपदम् (Sanskrit Version of Prof. P.Sriramachandrudu)

Unit - 3: गद्य साहित्यम् **(9h)**

1. अमोघदर्शनम् - बाणस्य कादंबरीतः
2. चारुचेष्टितम् - कविकोपकलापतः

Unit - 4: व्याकरणम् **(9h)**

1. अजन्त शब्दाः (नदी, तनु, वधू, मातृ, वन, फल, वारि, मधु)
2. धातवः (इष्, लिख्, कृञ्, क्रीञ्, चुर्, रमु, वन्द्, युध्)

Unit - 5: व्याकरणम् **(9h)**

1. सन्धयः (हल् सन्धिः – विसर्गसन्धिः)
2. समासाः (अव्ययीभावः, बहुव्रीहिः)

III Skill Outcomes:
On successful completion of this course, student shall be able to:

1. संस्कृतकवीनां पदवाक्यप्रयोगसरणेरवगतिः भवति ।
2. संस्कृतकवीनां भावगम्भीर्य परिज्ञानम् भवति ।
3. वाक्यरचनायाम् दोषराहित्यप्राप्तिः भवति ।

IV References:

1. Prescribed Sanskrit **Text Book II**

V Co-Curricular Activities: (Hours for Activity: 15h)

1. Assignments
2. Seminars, Group discussions, Quiz, Debates etc.
3. Invited lectures and presentations on related topics by experts.

I Year-II Semester

L	T	P	C
3	0	0	3

PROGRAMMING IN C

Course Objectives:

- Provides knowledge on Algorithms, Flow chart and basic programming language.
- Provides complete knowledge of C language.
- Helps to develop logics which will help them to create program and applications in C.
- Learning the basic programming constructs, they can easily switch over to any other language in future.

Course Outcomes:

Upon successful completion of this course, students will be able to-

- Understand the basic terminology used in computer programming.
- Write, compile and debug programs in C language.
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Understand the dynamics of memory by the use of pointers and Structures.
- Apply different operations in File handling.

Syllabus

UNIT - I:

Introduction to Algorithms and Programming Languages: Algorithm - Key features of Algorithms - examples of Algorithms, Flow Charts– Pseudo code, Programming Languages – Generation of Programming Languages – Structured Programming Language.

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, Type Conversion and Type Casting.

Case Study:

Enter any alphabet and display whether it is vowel or a consonant.

UNIT - II:

Control Structures and Functions: Decision Control and Looping Statements: Introduction to Decision Control Statements, Conditional Branching Statements, Iterative Statements, Nested Loops, Break and Continue Statement – Go to Statement. Functions: Introduction, Using functions – Function declaration/ prototype – Function definition, Function call – Return statement – Passing parameters, Scope of variables, Storage Classes, Recursive functions.

Case Study:

Print first 10 natural numbers. (using while, do-wile, for loop , break, continue.)

UNIT - III:

Arrays: Introduction, Declaration of Arrays, accessing elements of the Array – Storing Values in Array, Calculating the length of the Array, Operations that can be performed on Array, Passing one dimensional array to function.

Two dimensional Arrays, accessing two dimensional arrays, Passing two dimensional arrays to functions.

Strings: Introduction, String Operations using String functions.

Case Study:

- Searching an element in an array.
- Disadvantages of an array.

UNIT - IV:

Pointers, Structures and Unions: Pointers: Understanding Computer Memory – Introduction to Pointers, Declaring Pointer Variable, Pointer Expressions and Pointer Arithmetic – Null Pointers, Passing Arguments to Functions using Pointer, Pointer and Arrays – Passing Array to Function, Memory Allocation in C Programs, Memory Usage – Dynamic Memory Allocation, Drawbacks of Pointers. Structures: Introduction to structures, Nested Structures. Union, and Enumerated Data Types: Introduction to Union – accessing union elements, Enumerated Data Types**.**

Case Study:

Difference between Arrays, structures & unions

UNIT – V:

File Handling: Files: Introduction to Files, Using Files in C, Reading Data from Files, Writing Data from Files, Detecting the End-of-file, Error Handling during File Operations.

Case Study:

Write a program to read a text file, convert all the lowercase characters into upper case and rewrite the uppercase characters in the file.

PRESCRIBED TEXT BOOKS:

1. Computer Fundamentals and Programming in C by REEMA THAREJA from OXFORD UNIVERSITY PRESS

REFERENCE BOOKS:

1. E Balagurusamy, COMPUTING FUNDAMENTALS & C PROGRAMMING – Tata McGraw-Hill, Second Reprint 2008, ISBN 978-0-07-066909-3.
2. Ashok N Kamthane: Programming with ANSI and Turbo C, Pearson Edition Publ, 2002.
3. Henry Mullish&HuubertL.Cooper: The Sprit of C, Jaico Pub, House,1996.
4. Teach your C Skills-Kanithker

I Year-II Semester

L	T	P	C
3	0	0	3

OFFICE AUTOMATION TOOLS

Course Objectives:

- To introduce the environment of GUI in Ms-Word and its features..
- To introduce the fundamental concepts using Ms-Word and its features to make it more useful.
- To provide hands-on use of Word, Excel and PowerPoint.

Course Outcomes:

The students will be able:

- To understand concept of Word Processor and use its features.
- To use the advanced features of Ms-Word to make day to day usage easier.
- To work comfortably with Ms-Excel Environment.
- To Create worksheets and use advanced features of Excel.
- To create presentations and inserting multimedia items in them.

Syllabus

UNIT–I: Introduction to Ms-Office &Ms-Word

MS-Word: Features of MS-Word, MS-Word Window components, working with formatted text, Shortcut keys, Formatting documents: Selecting text, Copying &moving data, Formatting characters, changing cases, Paragraph formatting, Indents, Drop Caps, Using format painter, Page formatting, Header &footer, Bullets & numbering, Tabs, Forming tables. Finding & replacing text, go to(F5) command, proofingtext (Spellcheck, Auto correct),

Case Study:

1. Create a document to write a letter to the DM&HO of the district complaining about Hygienic conditions in your area.
2. Create a document to share your experience of your recent vacation with family.

UNIT–II: Ms-Word Advanced Features

Difference between Wizard and Template - Customize the Quick Access Tool Bar – Macros: Purpose – Creating Macro – Using Macro – Storing Macro - Inserting pictures: From Computer, Online Pictures –

Insert 3d Models - Insert Shapes – Insert Text Box – Insert Equation, Hyperlinks- Tables : Insert tables - Mail merge ,Printing documents, Tables : Insert tables, Mathematical calculations on tables data. Insert Text Box etc.

Case Study:

1. Create a document to send a holiday intimation to all the parents at time about Dasara Vacation.
2. Create a document to create Time Table of you class using tables.

UNIT–III: Introduction to Ms-Excel & Its Features

MS-Excel: Excel Features, Spread sheets, workbooks, creating, saving &editing a workbook, Renaming sheet, cell entries(numbers, labels, and formulas),spell check, find and replace, Adding and deleting rows and columns Filling series, fill with drag, data sort, Formatting worksheet, Functions and its types, Some useful Functions in excel(SUM,AVERAGE,COUNT, MAX,MIN, IF),

Case Study:

1. Create a worksheet with you class marks displaying total, average, top marks in the class and least marks in the class.
2. Create a Worksheet with employee no, name, job, salaries of 10 employees, calculate DA,TA,HRA ,Gross Salary and Net Salary.
   i) Find the sum of HRA's of Total employees.
   ii) Find the average DA
   iii) Display the Maximum salary of the employee.

UNIT-IV: Ms-Excel Advanced Features

Cell referencing (Relative, Absolute, Mixed), What-if analysis, Introduction to charts: types of charts, creation of charts, printing a chart, printing worksheet – Sort – Filters – View Menu- Goal Seek – Scenarios.

Case Study:

1. Prepare a chart with height and weights of you class mates in at least 3 types of charts.
2. Demonstrate the use of Filter with the attendance data of your class.

UNIT-V: Ms-PowerPoint and its Applications

MS-PowerPoint: Features of Power Point, Uses, components of slide, templates and wizards, using template, choosing an auto layout, using outlines, adding subheadings, editing text, formatting text, using master slide, adding slides, changing color scheme, changing background and shading, adding header and footer, adding clip arts and auto shapes. Various presentation, Working with slide sorter view(deleting, duplicating, rearranging slides),adding transition and animations to slide show, inserting

music or sound on a slide, viewing slideshow, Printing slides.

Case Study:

1. Prepare a presentation with your achievements and experiences in College.
2. Create a Presentation of your organization with pictures, clip arts and animations

Text Books:

1. Computer Fundamentals–Pradeep .K.Sinha: BPB Publications.
2. Fundamentals of Computers –Reema Thareja, Oxford University Press India

I Year-II Semester

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BUSINESS WRITING

(Skill Enhancement Course-I)

Course Outcomes:

By the end of this course, students will be able to:

- Understand the fundamentals of business writing, including style, tone, and language.
- Produce well-structured and concise business documents, such as emails, memos, and reports.
- Apply principles of effective communication in business letters and interoffice correspondence.
- Craft persuasive and well-organized business proposals and formal reports.
- Cultivate a professional and ethical approach to business writing.

UNIT-I:

Introduction to Business Writing: Importance and purpose of effective business writing; Characteristics of good business writing; Common challenges and misconceptions.

Writing Clear and Concise Emails: Appropriate email etiquette in the professional environment, organizing email content and using effective subject lines, Understanding tone and formality in email communication.

UNIT-II:

Memos and Interoffice Communication: Formatting and structure of memos, Writing memos for various purposes like updates, announcements, requests, Ensuring clarity and coherence in interoffice communication.

Business Letters and Formal Correspondence: Structure and components of a business letter, writing persuasive and professional business letters, Responding to inquiries and complaints effectively.

UNIT-III:

Business Proposals and Reports: Crafting business proposals for projects and initiatives, Formal report writing - format, sections, and organization, Analyzing data and presenting findings in reports.

Writing for Digital Platforms: Business writing for websites, social media, and online communication, Leveraging technology for efficient and impactful business writing

Activities:

1. Writing Assignments: Regular business writing tasks covering different document types.
2. Business Proposal Project: Crafting a comprehensive business proposal for a hypothetical scenario.
3. Reports and Presentations: Preparing formal reports and presenting findings to the class.
4. Quizzes and Tests: Assessing understanding of business writing principles and grammar.
5. Class Participation: Active engagement in discussions, peer reviews, and activities.

Text Books:

1. Business Writing Basics by Jane Watson (Author) Publisher: Self Counsel Press Inc; 2nd edition (1 August 2002) ISBN-10: 1551803860 ISBN-13: 978-1551803869
2. Successful Business Writing - How to Write Business Letters, Emails, Reports, Minutes and for Social Media - Improve Your English Writing and Grammar: of Exercises and Free Downloadable Workbook by Heather Baker Publisher: Universe of Learning Ltd; Illustrated edition (1 March 2012) ISBN-10 : 1849370745 ISBN-13 : 978-1849370745
3. Business Correspondence and Report Writing, 6th Edition by R C Sharma, Krishna Mohan, Virendra Singh Nirban. Publisher: McGraw Hill Education (India) Private Limited. ISBN-10: 9390113008 ISBN-13 : 978-9390113002

Reference Books:

1. "The Essential Business Handbook: The Nuts & Bolts of Getting Up and Running Fast" by John Storey and Amelia Storey (Indian Edition)
2. "The AMA Handbook of Business Writing: The Ultimate Guide to Style, Grammar, Punctuation, Usage, Construction, and Formatting" by Kevin Wilson and Jennifer Wauson

I Year-II Semester

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STOCK MARKET OPERATIONS

(Skill Enhancement Course-I)

Course Objectives:

This course aim at giving a comprehensive understanding on the stock market operations in terms of its structure, trading, settlement procedures, processes and related components and the regulations, emerging challenges in the Indian Stock market.

UNIT – I:

Markets – Introduction- Types of Markets; Primary Market: Meaning, Functions, Intermediaries - Role of Primary Market –New Issues Market –IPO's –Recent trends in Primary Market – Secondary Market: Functions, Various Stock Exchanges in India (BSE, NSE) and Regulatory framework– SEBI– Listing conditions–Secondary Market Intermediaries.

UNIT – II:

Stock Exchanges BSE, NSE & MCX –Different Trading Systems – DEMAT- Different types of Settlements –De-mat Settlement –Physical settlement - Pay-in and Pay-out –Bad Delivery –Short delivery –Auction –Market types, Order types and Books.

UNIT – III:

Stock Market Indices: Meaning, Purpose, and Construction in developing Index – Methods– Stock Market Indices in India – Scrip selection criteria for BSE Sensex and NSE S&P CNX Nifty. Overview: Derivatives, Commodity and Currency market.

Hands on Activities:

1. Detailed Group/Individual presentations on current year IPOs.
2. Demonstration of Stock Trading (Simulation).
3. Practical sessions on stock market operations.

References:

1. Punithavathy Pandian, Security Analysis and Portfolio Management, Vikas Publishing House Pvt. Ltd.
2. Prasanna Chandra, Investment Analysis and Portfolio management, Tata McGraw Hill, 3rd Edn.,

2008.

3. 3.V. A. Avadhani, Investment and Securities Market in India, Himalaya Publishing House.
4. Sanjeev Agarwal, A Guide to Indian Capital Market, Bharat Publishers.
5. Ravi Puliani and Mahesh Puliani, Manual of SEBI, Bharat Publication.

I Year-II Semester

L	T	P	C
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MARKETING SKILLS

(Skill Enhancement Course-II)

Course Objective:

This course will help the students to develop a better appreciation and understanding of the role of marketing in a business organization specifically, and able to have operational skills of various marketing activities.

Learning Outcomes:

The learner is able to:

- Formulate a marketing plan that will meet the needs or goals of a business organization and Conduct market research to provide information needed to make marketing decisions.
- Understand different strategies for effective design of Marketing Mix;
- Know the Sales Skills including effective personal selling skills;

UNIT I: Introduction to Marketing: (10 Hrs)

Core Marketing Concepts – Company Orientation towards the Marketplace – The Holistic Marketing Concept - Marketing Management Tasks; Marketing Environment: Macro and Micro Components and their Impact on Marketing Decisions – Marketing Research and Information; Market Segmentation, Targeting and Positioning Strategies - Determinants of Consumer Behaviour;

UNIT II: Marketing Mix: (12 Hrs)

Elements of Marketing Mix - Product, Price, Promotion and Place, 7P's of Service Marketing Mix; Product: Classification of Products - Product Life Cycle - New Product Development – Branding Decisions; Price: Pricing Strategies: Understanding Pricing – Steps in setting the Price - Price Adapting Policies, and Initiating and Responding to Price Changes: Promotion: Marketing Communications, Promotion Mix Elements: Advertising, Sales Promotion, Personal Selling, Events and Experiences, Public Relations and Publicity, Online and Social Media Marketing; Place: Marketing Channels: Channel Functions and Flows, Channel Management Decisions.

UNIT III: Nature and Role of Selling: (8Hrs)

Importance of Selling, Nature and Role of Selling: Importance of Selling – Role in the Context of

Organization; Attributes of a Good Salesperson: Personality and Physical Characteristics, Enthusiasm, Confidence, Intelligence, Self-Worth, Knowledge-product, Competition, Organization, Market, Customer, Territory; Communication Skills, Persuasive Skills. Personal Selling Skills: The opening – Need and problem identification–the Presentation and Demonstration – Dealing with Objections – Negotiations – Closing the Sale -follow up.

Curricular Activities:

1. Analyze different needs and wants of consumers in your locality or region
2. Prepare the prevalent marketing environment in your locality or region.
3. Identify Product Life Cycle stages of few Products like consumer durables (ex., Electronic goods, Computers, etc.).
4. Analyze Marketing strategies/planning used by automobile cosmetic and FMCG companies.
5. Conduct Market Research for the need of new products in your region.

References

1. Philip Kotler, Kevin Lane Keller, Abraham Koshy & Mithileswar Jha, Marketing Management - A South Asian Perspective, Pearson Education.
2. Agarwal, P.K., Marketing Management – An Indian perspective, PragatiPrakasham
3. Kazmi SHH, Marketing Management Text and Cases, Excel.
4. Philip Kotler and Armstrong.G., MARKETING, Prentice Hall of India, 12th Edition.
5. Core Selling Skills: Because Selling Is All About People Paperback – 1 January 2015 by Les Giblin (Author)
6. Ramaswamy V.S. &NamaKumari, S., Marketing Management – Planning and Control, Macmillan.

E- Learning Reference:

1. https://www.udemy.com/course/the-new-manager-managing-people-teamsprocesses/?utm_source=adwords&utm_medium=udemyads&utm_campaign=Leadership_v.NONP_la.EN_cc.INDIA&utm_term=_._ag_136108019508_._ad_606494316205_._de_c_._dm._pl ._ti_kwd295074359507_._li_9302139_._pd ._&utm_term=_._pd._kw_business+management+and+leadership_._&matchtype=b&gclid=CjwKCAjww7KmBhAyEiwA5-PUSp4Q_OUYVm29rgKdiM_Oc2hfjgLJIb6F2pxFukILjqtD-JDI8-kEYxoC6W4QAvD_BwE

I Year-II Semester

L	T	P	C
2	0	0	2

INVESTMENT PLANNING

(Skill Enhancement Course-II)

Course Objectives:

The objective of the course is to make the students familiarize with the concepts of investment, associated risks along with the regulatory authorities that monitor the capital market**.**

UNIT – I:

Investment: Attributes of Investment, Investment and speculation, Features of a good Investment, Investment Process.

Investment Avenues – Types. Tax saving options.

UNIT – II:

Return and Risk: Meaning and Measurement of Security Returns, Meaning and Types of Security Risks- Systematic Vs Non-systematic Risk, Measurement of Total Risk – Intrinsic Value Approach to Valuation of Bonds and Shares.

UNIT – III:

Portfolio: Choosing the right Investment options, Construction of Investment portfolio, and Portfolio management. Investor Protection Guidelines of SEBI– SEBI Investment Advisors Regulations.

Hands on Activities:

1. Group/Individual presentations on Investment Alternatives (Advantages, Suitability and Limitations).
2. Calculation of Stock Return and Risk from historical data of NSE and BSE.
3. To make comparative analysis between various stocks using excel.

References:

1. Prasanna Chandra, Investment Analysis and Portfolio Management, Tata McGraw Hill.
2. Bhalla VK, Investment Management, S.Chand.
3. Donald E.Fischer, Ronald J.Jordan, Security Analysis and Portfolio Management; Prentice Hall of Inida.
4. Preeti Singh, Investment Management, Himalaya Publishers.
5. Pitabas Mohanty Spreadsheet Skills for Finance Professionals Taxmann Publications.

I Year-II Semester

L	T	P	C
2	0	0	2

DIGITAL LITERACY

(Skill Enhancement Course-II)

Course Outcomes:

By undergoing the Digital Literacy course, one should acquire basic knowledge on Computer and he/she is able to

CO1: Perform operations on the computer

CO2: Access the Internet and finding information of interest

CO3: Register for an E-mail account and operating it

CO4: Make bill payments and use other applications of Internet

CO5: Create, edit and format documents using a word processor

UNIT-I:

operate the elements of a computer and performing operations on the computer Operate the elements of a computer including power cord, power switch, network connecting cable, USB ports, Mouse operations, Keyboard operations, interface icons, GUI elements, Editing options, perform operations including switching on the computer, logging in, locating a file, opening a file, printing a document, storing a file with proper extension, creating a folder/ sub folder in a volume on hard disk and desktop, shifting files from one folder to another, shutting off the computer

UNIT-II:

Access the Internet to browse information and E-mail operation Access the Internet, use a search engine, find information on the topic of interest, register for a web-based E-mail account, access E-mail with attachments, reply to an E-mail, forward an E-mail and delete an E-mail message

UNIT-III:

Make bill payments, other applications using Internet and word processing Make utility bill payments, booking bus/train tickets, bank transactions, personal transactions, job search through employment portals, mobile/DTH recharge, word processing basics, creating, editing and formatting of text, saving and printing of word document

Prescribed readings:

1. Appreciation of Digital Literacy Handbook published by Department of Electronics & Information Technology, Ministry of Communications & Information Technology, Government of India

Web Resources:

1. https://youtu.be/b2X_j5Bz-VM
2. https://youtu.be/jln3-P6L2ro
3. https://youtu.be/cfDisqUMIvw
4. https://youtu.be/3h_PyURcdrc
5. https://youtu.be/EqN0LBcydBg

Note: Digital Literacy course should be taught by blending the practical demonstration of concepts with hands-on experience by learners using desktop/laptop computer and mobile handset devices

I Year-II Semester

L	T	P	C
0	0	2	1

Programming in C Lab

List of Experiments

1. Write a C program to calculate the expression: ((a*b)/c)+(a+b-c) .
2. Write a C program to calculate $(a+b+c)^3$.
3. Write a C program to check whether the given number is Prime or Not.
4. Write a C program to find the sum of individual digits of a given number.
5. Program to convert Hours into seconds.
6. Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
7. Write a program to check whether the given number is Palindrome or Not.
8. Write a C program to check whether a given 3-digit number is an Armstrong number or not.
9. Write a C program to print the numbers in triangular form.

   1

   1 2

   1 2 3

   1 2 3 4
10. Program to display the number of days in a given month using Switch – Case.
11. Write a C program to perform the following:
    a) Addition of two matrices.
    b) Multiplication of two matrices.
12. Write a C program to determine if the given string is a palindrome or not.
13. Write C program to find the factorial of a given integer using a recursive function.
14. Write a C program to concatenate two strings using pointers.
15. Write a C program to find the length of a string using pointers.
16. Program to display Student Details using Structures.
17. Write a C program to
    a) Write data into a File.
    b) Read data from a File.

I Year-II Semester

L	T	P	C
0	0	2	1

OFFICE AUTOMATION TOOLS LAB

List of Experiments

1. Design a visiting card for managing director of a company as per the following specification.
    - Sizeofvisitingcardis3½×2
    - Name of the company with big font
    - Phone number, Fax number and E-mail address with appropriate symbols.
    - Office and Residence addresses separated by new line
2. Create a table with following columns and display the result in separate cells for the following
    - Emp Name, Basic pay, DA, HRA, Total salary.
    - Sort all the employees in ascending order with the name as the key
    - Calculate the total salary of the employee
    - Calculate the Grand total salary of the employee
    - Find highest salary and
    - Find lowest salary
3. Prepare an advertisement to company requiring software professional with the following
    - Attractive page border
    - Design the name of the company using WordArt
    - Use at least one clipart.
    - Give details of the company(use bullets etc.)
    - Give details of the Vacancies in each category of employee's(Business manager, Software engineers, System administrators, Programmers, Data entry operators) qualification required.
4. Create a letter head of a company with the following specifications
    - Name of the company on the top of the page 2 with big font and good style
    - Phone no, Faxno and E-mail address with symbols.
    - Main products manufactured by the company
    - Slogans if any should be specified in bold at the bottom
5. Create two pages of curriculum vitae of a graduate with the following specifications
    - Table to show qualifications with proper headings
    - Appropriate left and right margins
    - Format ½pageusingtwo-columnapproachabout yourself

- Name on each page at the top right side
- Page no. in the footer on the right side.

6. Write a macro format document as below o Line spacing“2”(double)
   - Paragraph indent of0.1
   - Justification formatting style
   - Arial font and Bold of14pt-size
7. Create a letter as the main document and create 10 records for the 10 persons Use mail merge to create letter for selected persons among 10.
8. Create an electronic spread sheet in which you enter the following decimal numbers and convert the number to octal, Hexadecimal and binary numbers and vice-versa.

   Decimal Numbers: 35, 68, 95, 78, 165, 225, 355, 375, 465

   Binary Numbers:101, 1101, 11101, 11111, 10001, 11101111
9. Calculate the net pay of the employees following the conditions below.

	A	B	C	D	E	F	G	H	I
1	Employee Number	Employee Name	Basic Pay	DA	HRA	GPF	Gross Pay	Income Tax	Net Pay
2									

   - DA:- 16% of the basic pay if Basic pay is greater than 20000 or else 44%.
   - HRA:- 15 % of the Basic pay subject to maximum of Rs.4000.
   - GPF: -10% of the basic pay.
   - INCOMETAX:-10% of basic If Basic pay is greater than20000.
   - Find who is getting highest salary & who is get lowest salary?

10. The ABC Company shows the sales of different product For5years.CreateBARGraph, 3D and Pie chart for the following.

A	B	C	D	E	F
S.No	Year	Pro1	Pro2	Pro3	Pro4
1	1989	1000	800	900	1000
2	1990	800	80	500	900
3	1991	1200	190	400	800
4	1992	400	200	300	1000
5	1993	1800	400	400	1200

11. Create a suitable examination database and find the sum of the marks(total) of each student and respective, class secured by the student.
    - Pass – if marks in each subject >= 35
    - Distinction- if average >= 75
    - First class - if average >=60 but <75
    - Second class – if average >=50 but l<60
    - Third class – if average >=35 but <50
    - Fail: if marks in any subject <35

12. Enter the following data in to the sheet.

Name	**Department**	**Salary**
Anusha	Account	12000
Rani	Engineering	24000
Lakshmi	Accounts	9000
Purnima	Marketing	20000
Bindu	Accounts	4500
Tejaswi	Accounts	11000
Swetha	Engineering	15000
Saroja	Marketing	45000
Sunitha	Accounts	5600
Sandhya	Engineering	24000
Harika	Marketing	8000

    - Extract records for department in Accounts and Salary>10000
    - Sort the data by salary with the department using “sort commands”.
    - Calculate total salary for each department using Subtotals

13. Enter the following data into the sheet.

	Raju	Rani	Mark	Rosy	Ismail	Reshma
English	76	89	43	51	76	87
2nd Lag	55	85	78	61	47	33
Maths	65	82	34	58	52	65

Computers	45	91	56	72	49	56
Human Values	51	84	54	64	32	64

Apply the conditional formatting for marks

- 35 below Red
- 35 to 50 Blue
- 51 to 70 Green
- 71 to 100 Yellow

14. Create a presentation using templates.
15. Create a Custom layout or Slide Master for professional presentation.
16. Create a presentation with slide transitions and animation effects.
17. Create a table in PPT and apply graphical representation

Subject: ANIMATION (MINOR)

COURSE STRUCTURE

Semester	Course Number	Course Name	No. of Hrs/Week	No. of Credits
Semester-II	1	Basic Drawing	3	3
		Basic Drawing Lab	2	1
Semester-III	2	2D Animation	3	3
		2D Animation Lab	2	1
Semester-IV	3	Introduction to 3D	3	3
		Introduction to 3D Lab	2	1
	4	Compositing - I	3	3
		Compositing - I Lab	2	1
Semester-V	5	Advanced 3D	3	3
		Advanced 3D Lab	2	1
	6	Compositing - II	3	3
		Compositing - II Lab	2	1

II Semester

L	T	P	C
3	0	0	3

BASIC DRAWING

Course Objectives:

- Develop foundational drawing skills: The course aims to help students develop a solid foundation in drawing by teaching them fundamental techniques such as line work, shading, perspective, proportion, and composition.
- Enhance observation and perception skills: Through various exercises and activities, the course seeks to improve students' ability to observe and perceive details, shapes, forms, and textures in their surroundings.
- Learn and practice light and shadow techniques: Students will learn how to effectively use shading techniques to create depth, volume, and realistic forms in their drawings.
- Explore different drawing mediums: The course may introduce students to a range of drawing mediums such as graphite, charcoal, ink, and colored pencils.
- Develop perspective drawing skills: Students will learn the principles of perspective drawing, including one- point, two-point, and three-point perspective.

Course Outcomes

Students at the successful completion of the course will be able to:

- Students will acquire a solid understanding of fundamental drawing techniques, including line work, shading, perspective, proportion, and composition.
- Students will develop their ability to observe and analyze their surroundings, paying attention to details, shapes, forms, and textures.
- Students will develop a strong understanding of how light interacts with objects and how to represent it in their drawings.
- Students will grasp the principles of perspective drawing and be able to create drawings that accurately represent three-dimensional space.
- Students will explore their creative potential and develop their unique artistic style.

UNIT - I:

Sketching Materials: Gather essential sketching materials such as pencils (varying in hardness), erasers, sketching paper, and a sharpener. Experiment with different types of pencils to understand their range of values and textures.

UNIT - II:

Drawing Exercises and Prompts: Engage in regular drawing exercises and prompts to improve your skills and creativity. These can include timed sketches, drawing from memory, drawing using limited lines, or experimenting with different styles and techniques.

UNIT - III:

Lines and Contour Drawing: Learn about different types of lines and how to control their weight and direction. Practice contour drawing by observing objects or subjects and following their outlines with your eyes and pencil, without looking at your paper.

UNIT - IV:

Perspective: Study the fundamentals of perspective drawing to understand how objects appear in three-dimensional space. Learn about one-point, two-point, and three-point perspective and practice drawing simple objects and scenes using these principles.

UNIT - V:

Light and Shadow: Explore the concepts of light and shadow in drawing. Learn about different lighting techniques, shading, and rendering to create depth and dimension in your drawings, Practice observing how light falls on objects and replicate those effects in your sketches.

References:

1. Drawing on the Right Side of the Brain" by Betty Edwards - This book is a classic resource for beginners, focusing on teaching the fundamental skills of drawing, perception, and artistic expression
2. Keys to Drawing" by Bert Dodson - This book covers a range of drawing techniques and exercises to help students develop their skills in line drawing, shape, shading, and composition.
3. Drawing for the Absolute and Utter Beginner" by Claire Watson Garcia - A beginner-friendly guide that provides step-by-step instructions and exercises to help aspiring artists gain confidence in their drawing abilities.

Web resources suggested by the Teacher concerned and the college Librarian including reading material

Co-Curricular Activities:

1. Art Club: Start an art club at your school or join an existing one. This can be a platform for students to come together, share their drawings, collaborate on art projects, participate in group exhibitions, and organize art-related events or workshops.

2. Drawing Workshops: Organize or participate in drawing workshops conducted by professional artists or art educators.
3. Competitions and Exhibitions: Encourage students to participate in drawing competitions or art exhibitions. This can be at the school level, local art festivals, or regional/national events.
4. Art Contests and Challenges: Engage students in online art contests or drawing challenges that focus on specific themes or techniques.
5. Sketching Outings: Organize sketching outings to local parks, museums, historical sites, or nature reserves. This allows students to practice drawing from observation, explore different subjects, and engage with their surroundings. It also encourages a sense of community among fellow artists.

Suggested Co-Curricular Activities:

1. Training of students by a related field expert
2. Group discussions, Quiz, Debates, etc
3. Preparation of videos and PPT for the subject related presentations
4. Collection of material on the topics
5. Invited lectures and presentations on related topics

II Semester

L	T	P	C
0	0	2	1

BASIC DRAWING LAB

List of Experiments:

1. Materials: Gather the necessary drawing materials, such as pencils, erasers, drawing paper, and any additional preferred mediums (e.g., charcoal, ink, colored pencils).
2. Warm-up Exercise: Start with a warm-up exercise to loosen up your hand and practice drawing different types of lines. Experiment with straight lines, curved lines, dashed lines, thick lines, thin lines, and any other variations you can think of. Fill a page or two with these line exercises.
3. Line Study: Choose an object or scene with interesting shapes and contours. Using light pencil strokes, create an outline of the object, focusing on the various lines and contours that define its form. Pay attention to the direction and weight of the lines, as well as the negative spaces created by the object.
4. Shape Exploration: Select a few everyday objects around you (e.g., a mug, a book, a fruit). Instead of drawing detailed outlines, focus on capturing the basic shapes that make up the objects. Start by identifying the basic geometric shapes (circles, squares, triangles) and then add more complex shapes as needed.
5. Still Life Drawing: Set up a simple still life arrangement using objects of your choice. Arrange them in an interesting composition with varying shapes and sizes. Using your preferred drawing medium, create a detailed drawing of the still life, paying attention to the shapes, proportions, and relationships between the objects.

III Semester

L	T	P	C
3	0	0	3

2D ANIMATION

Course Objectives:

- Introduction to 2D Animation: Provide an overview of the history, principles, and techniques of 2D animation, including keyframe animation, tweening, and frame-by-frame animation.
- Animation Principles and Techniques: Teach students the fundamental principles of animation, including timing, spacing, anticipation, follow-through, and exaggeration.
- Storytelling and Narrative: Explore the art of storytelling through animation. Teach students how to develop storyboards, create engaging narratives, and effectively communicate emotions and ideas through their animations.
- Build a Strong Portfolio: Create a diverse and high-quality portfolio that showcases your range of skills and abilities. Include various animation styles and demonstrate your storytelling capabilities.
- Industry Awareness and Professional Development: Familiarize students with the current trends, practices, and career opportunities in the animation industry.

Course Outcomes

Students at the successful completion of the course will be able to:

- Understanding of Animation Principles
- Proficiency in Animation Software
- Storytelling and Narrative Skills
- Character Design and Animation
- How to develop storyboards

UNIT-I:

What is Animation- History of Animation (late 19th – early 20th century), Mid-20th century Animation, Golden Age of Animation, Digital Age and CGI Dominance, about traditional animation, Animation devices: phenakistoscope, Zoetrope, thaumatrope, Praxinoscope, flip book.

UNIT-II:

Adobe Animate: Interface and Workspace, panels, tools, and timelines, Drawing and Vector Art, Tools: Selection, Free Transform Tool, Brush Tool, Pencil Tool, Paint Bucket Tool, Text Tool, Bone Tool, Shape Tools, Deco Tool, 3D Transformation Tools, Bone and IK Tools, Layers, types of layers, frames, types of frames, time line bar, Onion Skin – FPS

UNIT-III:

Symbols, Graphics, Movie Clip & Button, Tweening, Types of Tweens, Object & Merge Drawings, Gradient Color,

Color Effects, Filters, Shape Tween, Shape Hint Tween, About Mask, Layer Mask, Motion guide, Ease in and Ease out Animation, Working Frame - by - Frame Animations, Working on Tween Animation.

UNIT-IV:

Character creation: Character Model, Rigging, hierarchy of symbols, attaching bones and joints, Walk Cycle Animation, Facial Expressions and Lip Syncing, symbols or frame-by-frame animation to create realistic facial movements, synchronize the character's mouth with dialogue or sound.

UNIT-V:

Creating Background Scenes, Reference and Conceptualization, Layering and Depth, Drawing and Painting Tools, Gradients and Shadows, Atmospheric Effects, Camera Movement, Idle and Secondary Animations, Adding Audio to Scene, Publish Movie, Publish Setting.

References:

1. The Art of Stop motion animation: Ken A Priebe
2. Stop motion: Craft skills for model Animation: Susannah Shaw
3. Stop motion: Passion, Process and Performance: Barry JC Purves
4. Creating 3D Animation - The Aardaman Book of Film making: Peter Lord & Brian Sibley
5. Stop motion Armature Machining - A Construction Manual: Tom Brierton
6. A Century of Stop Motion Animation from Melies to Aardaman: Ray Harry Hausen
7. Stop motion Filming and Performance: Tom Brierton
8. Stop motion Puppet Sculpting: Tom Brierton

Web resources suggested by the Teacher concerned and the college Librarian including reading material

Co-Curricular Activities:

- Follow the given assignments
- Study tour for getting professional practice in industry-standard Stop Motion
- Students will give seminar on Oral presentation of the Stop Motion animation
- Conducting quiz program on the Stop Motion Animation
- Group Discussions on Stop Motion Animation

Suggested Co-Curricular Activities:

- Follow the given assignments
- Study tour for getting professional practice in industry-standard Stop Motion
- Students will give seminar on Oral presentation of the Stop Motion animation
- Conducting quiz program on the Stop Motion Animation
- Group Discussions on Stop Motion Animation

III Semester

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2D ANIMATION LAB

List of Experiments:

1. Domain specific quiz
2. Practical production work on Stop Motion animation
3. Presentations on outputs
4. Character Walk Cycle.

IV Semester

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INTRODUCTION TO 3D

Course Objectives:

- Understand the virtual 3D space and how to build objects
- Create objects using primitive shapes and sub patch geometry
- Analyse the importance of file backup and management(projects setup)
- Evaluate the projects and assignments developed/prepared by the students

Course Outcomes:

Students at the successful completion of the course will be able to:

- Equip with the basic knowledge of Autodesk Maya
- Getting sufficient knowledge for doing simple 3D project
- Develop the skill of overall 3D workflow
- Understanding the use of lights
- Learn how to render 3D objects

UNIT-I:

Introduction on Modelling , Fundamentals of modelling, Introduction to the interface of Maya, Menu set, Main Menu Bar, Panel Menu, The Channel Box and Layer Editor, Shelf, Creating New Shelf , Hotkeys, Viewport, Attribute Editor, Hot Box, Setting and Preferences, New, Set Project, modelling by basic geometrical primitives, Duplicating objects , Outline.

UNIT-II:

Import Images**,** viewport references, Model using Reference images, basic posture, Props Modelling, NURBS, CV, EP, Bezier, Pencil Curve tools, Mesh Conversion, Polygon to Nurbs, Nurbs to polygon, High poly, Low Poly, Difference between hi- poly & low-poly characters.

UNIT-III:

Explanation of Material Editor and Applying Materials, Introduction to basic material types & Procedurals, Study of concepts: Opacity, Transparency, Secularity and colour, Working with Transparency, Reflection & Refraction, Bump & Displacement Maps, Explanation of Textures and UVW Mapping, Texture mapping, Wrapping of texture on a 2D surface.

UNIT-IV:

Lighting, Working with Arnold Lights 1-Point, Direct, Spot, Working with Maya Lights 2-Ambient, Area and Volume, Direct Illumination and Illuminating a Stage Show, Three Point Lighting and Exterior Lighting, Cast shadows, decay rate, Previewing lighting and shadows creating depth map Shadow, creating ray-traced

UNIT-V:

Concept of a lighting system and shadows, Creating area light shadows, setting area light visibility, Creating soft shadows with spotlights, rendering an AVI, Rendering an image sequence. Render layers: introduction, creating, Applying to render layer presets, setting overrides, creating render layer composites, Render Passes: Introduction, compare render passes and render layers, Render quality: anti-aliasing, setting colour profiles, diagnosing ray tracing.

References:

- Peter Ratner-3D Human Modelling and Animation
- 3D Modelling and Printing with Tinkercad: Create and Print - Book by James FloydKelly
- Integrating 3D Modelling, Photogrammetry - Book by David Halbstein and Shaun Foster
- D Automotive Modelling: An Insider's Guide to 3D Car - Book by Andrew Gahan

Web resources suggested by the Teacher concerned and the college Librarian including reading material

Co-Curricular Activities:

- Presentation on Modeling, Texturing Rendering, and popular work flow
- Demonstrate or Exhibit(museum) developed projects
- Group discussion on 2D, & 3D objects
- Study tour or Visit to production house to get knowledge on the 3D pipeline
- Exhibit on the external and internal models with a team project

Suggested Co-Curricular Activities:

- Written assignment
- Self-directed study with peers and tutors
- Evidence of process and experimentation in response of animation

IV Semester

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INTRODUCTION TO 3D LAB

List of Experiments:

- Create any Model some objects such as chairs, tables, fruits, utensils
- Create any Model instruments, tools
- Apply basic material and shader types & Procedurals textures.
- Unwrap the models of objects and characters using various projection maps.
- Apply texture on various objects and characters.
- Create Opacity, Smoothness, Secularity, and color maps, Transparency, Reflection
- Bump & Displacement Maps
- Render a frame and video of indoor and outdoor scenes.
- Render a video of indoor scenes.

IV Semester

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COMPOSITING - I

Course Objectives:

- Understand the fundamental concepts of compositing and its role in visual effects and motion graphics.
- Navigate and utilize the After Effects interface effectively.
- Import and organize footage, create compositions, and set up project settings for compositing.
- Apply various masking techniques to isolate and manipulate objects within a composition.
- Track and match move objects using After Effects' built-in tracking tools

Course Outcomes

Students at the successful completion of the course will be able to:

- Analyze and awareness of computer graphics software
- Understand and recognize the different techniques in the VFX
- Create a drawing using motion graphics techniques
- Evaluate the own assignment
- Demonstrate the assignments

UNIT-I:

Introduction to layer-based software – Workspace and panels – Timeline panel – Working with composition settings – Importing and interpreting video and audio – Frame rate – Pixel aspect ratio and frame aspect ratio – Preparing and importing – Layers and properties – Selecting and arranging layers – Null object layers – 3D layer

UNIT- II:

Cameras – Lights – Points of interest – Animation and keyframes - Keyframe interpolation – Controlling speed – Animating with puppet tools – Time stretching and time remapping – Paint tools: Brush, Clone Stamp, and Eraser – Shapes and Mask

UNIT- III:

Creating Text – Editing text layers – Animating text - Alpha channels – Masks – Mattes – Keying – Roto Brush - Refine matte – Motion graphics – Blur – Sharpen – Channel effects

UNIT- IV:

Color Correction effects – Time remapping – 3D Camera tracking – Transparency – Compositing - Effects – 4-Color gradient effects – fill effects – Fractal effect – Ramp effects – paint bucket effects – Lens flare effect – Vegas effects – write-on effect – Drop shadow effects – Shatter effects – cc effects

UNIT-V:

Rig removal - Morphing - XMP metadata – Expression basics – Transition – Compositions – Tracking and stabilizing – Audio effects – Audio transition – Rendering and exporting – Exporting still images – Exporting Image sequences

References:

- The Art and Science of Digital Compositing Book by Ron Brinkmann
- Compositing Visual Effects: Essentials for the Aspiring Artist Book by Steve Wright
- Digital Compositing in Depth! Book by Doug Kelly
- Adobe After Effects CS6 Classroom in a Book by Adobe Creative Team (Author)

Web resources suggested by the Teacher concerned and the college Librarian including reading material

Co-Curricular Activities:

- Workshop/Seminar on motion graphics
- Work on the given assignments
- The individual shooting of your original footage for the demo reel
- Visit the Chroma studio to shoot green/blue screen footage
- RVJ (Reflective Visual Journal) on the theory and particles

Suggested Co-Curricular Activities:

- Oral presentations
- Self-reflective blogs
- Practical production works
- Peers and self –assessment for output
- Invited lectures and presentations on related topics

IV Semester

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COMPOSITING – I LAB

List of Experiments:

- Rotoscopy
- Keying (Green/Blue screen shooting and compositing
- Color Correction
- Tracking and Stabilizing
- Day to Night convert
- Wire or Rig Removals
- Motion poster design
- Title animation with write on
- Info-graphic and Motion graphic using with the effects

V Semester

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ADVANCED 3D

Course Objectives:

- Understand the origins of 3D Animation practice
- Learn fundamental principles of 3D animation
- Analyse the development in the 3D production
- Create the Artefacts appropriate for each stage of the pipeline

Course Outcomes

Students at the successful completion of the course will be able to:

- Students at the successful completion of the course will be able to:
- Hands-on experience on the processes
- Tools
- Techniques
- stages of production inherent in the 3D industry

UNIT-I:

Introduction to bone system/Joints and IK handles - Creating bone system and maintaining naming conventions - Skinning types - Import and export of skin weights - IK and FK basics - IK and FK switch - Introduction to Deformers - Introduction to constrains and implementation to rig - Maintaining proper hierarchy- Grouping and creating controls - Rigging the characters - Use of deformers in the rigging process.

UNIT-II:

Brief about animation principles - Animation tools in 3D - Applying classical 2D animation techniques - Stretch squash for the 3D character - Creating the illusion of weight - Overview of Maya - Playback controls and Exploring Maya animation preferences - Details about graph editor - Bouncing Ball Exercise - Body language - Animating object along a motion path - Utilizing the tracks-editor to blend animation clips - Controlling attributes with set driven keys - Animating with constraints.

UNIT-III:

Key framing – Graph editor – Set the beginning and ending keys – Keys to make a ball bounce – Speed up the animation – Tune the animation curve – Set driven key – Playback range and create the objects – Examine the driven key – Path animation – Raise the train above the path – Trax Editor – Character set

– Motion with a new clip

UNIT-IV:

Previewing animations in real-time with play blasts, Introduction to scene animation and key framing, dope sheet. Animal walk& run cycles, snakes, and birds, Biped Character walk cycles, Biped Character run cycles, pushing and pulling objects, Facial animation and lip-sync, Nonlinear Animation with Trax editor, Working with character sets and clips, character interactions.

UNIT-V:

Rendering Overview, what is rendering, How Maya renders Shader Networks, Shading Groups, Materials, Lights, Maya architecture, Nodes and Attributes, Hyper graph, IPR (Interactive Photorealistic Rendering), V-Ray techniques.

References:

- Character Emotion in 2D and 3D Animation Book by Les Pardew
- Introducing Character Animation with Blender Book by Tony Mullen
- Mastering 3D Animation Book by Peter Ratner
- The Art of 3D Computer Animation and Effects Book by Isaac Victor Kerlow
- 3D Animation Essentials Book by Andy Beane

Web resources suggested by the Teacher concerned and the college Librarian including reading material

Co-Curricular Activities:

- Follow the given assignments
- Study tour for getting professional practice in industry-standard 3D Softwares
- Students will give seminar on Oral presentation of the animation
- Conducting quiz program on the 3D
- Group discussions on 3D Pipeline

Suggested Co-Curricular Activities:

- Domain specific quiz
- Practical production work on 3D portfolio
- Oral presentations on outputs

V Semester

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ADVANCED 3D LAB

List of Experiments:

- Character Acting
- Creature Animation
- Lip Sync and Dialogue
- Advanced Rigging
- Physical-Based Animation

V Semester

L	T	P	C
3	0	0	3

COMPOSITING - II

Course Objectives:

- Explore advanced compositing techniques such as multi-layer blending, masking, and integration of complex elements into a scene.
- Learn the art of digital matte painting to create realistic and detailed backgrounds for composites.
- Master the techniques of working with green screen footage and rotoscoping to seamlessly integrate subjects into various backgrounds.
- Dive deeper into masking and selection tools, including channel-based selections, advanced edge refinement, and precise control over complex subjects.
- Learn how to integrate 3D elements into 2D composites, including matching lighting, shadows, and perspectives for a cohesive final image.

Course Outcomes

Students at the successful completion of the course will be able to:

- Analyze various techniques for realistic effects
- Create and Recognize the different techniques in the VFX
- Understand the shooting techniques in visual effects sequences
- Apply the filters and effects to get photorealistic
- Acquire a high level of expertise in advanced compositing techniques, allowing you to create visually stunning and seamless composites.

UNIT-I:

Introduction to the interface–Introduction to the flow editor–Working with polylines–Working with effect masks–working with motion paths – Working with grid warp deformations– particles–3D interface–working with auxiliary channels–Stereoscopic and optical flow - Previews and Final renders.

UNIT-II:

Induction to node software–Understanding the workflow–Toolbar–Menu bar–Properties panels–Project Settings - Read & Write nodes – Node software file name variables - File formats - Color space in node software - Color space LUT & viewer LUT - Reformat Animation Parameters – Curve Editor – Keying – Working with paint and rotoscoping–Color and Rotoscoping-3D integration–Warping and Morphing Images–Tracking–Stabilizing– Image- ased keying - Renders.

UNIT-III:

User interface–Project–Sessions–Using the timeline–Adding note–Curve Editor–Nodes–Roto–Motion Blur–

Paint–Clone Brush-Power Matte–Closed shape method–Blue/Green screen keying–zMatte–Pin Based warping–Shape-based warping-Morphing–Inverse Kinematics– Planar Tracker–Point Tracker–Offset Tracking – Modifying Tracking Data – Stereo paint – Rendering

UNIT IV:

Planar tracking - the lynchpin to mocha, Fast mask creation, inserts, and even 3D camera tracking are impossible without solid tracking data, Tougher tracks, Stabilization, Skin retouch, Camera Tracking Roto tips & tricks in mocha,3D camera solve, Removing lens flare, Techniques for removal, and background patching.

UNIT-V:

The user interface, project overview, shot overview, 3D perspective, an orthographic view, Useful Keys, Menus, tracking menu, camera menu, Import footage, Tracking Parameters, Color key, Clean Auto Feature Tracks, Survey Data, Camera Parameters, Solver Controls, Lens distortion, Depth Map, Importing footage, Footage format, footage properties, camera parameters, Auto feature tracking, Tracking length graph(Track-L), Tracking Error Graph(Track–E), Editing feature track F-Curves, creating masks, tracking masks, image masks, solving camera motion, constraints, survey data.

References:

1. Nuke 101: Professional Compositing and Visual Effects Book by Ron Gambar
2. Digital Compositing with Nuke by Lee Lanier (Author)
3. The VES Handbook of Visual Effects: Industry Standard VFX Practices and Procedures by Susan Zwerman (Editor), Jeffrey A. Okun (Editor)
4. The Art and Science of Digital Compositing: Techniques for Visual Effects, Animation and Motion Graphics (The Morgan Kaufmann Series in Computer Graphics) by Ron Brinkmann (Author)

Web resources suggested by the Teacher concerned and the college Librarian including reading material

a) Co-Curricular Activities:

- Workshop/Seminar on VFX techniques and projects
- Assignments on compositing
- Study tour for the Outdoor and Indoor shooting to collecting own footage for VFX
- RVJ (Reflective Visual Journal)

b) Suggested Co-Curricular Activities:

- Training of students by related field experts.
- Skill Development through Group discussions, Quiz, Debates, etc
- Preparation of videos and PPT’s for the subject related presentations
- Collection of material on the topics using Internet
- Invited lectures and presentations on related topics

V Semester

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COMPOSITING – II LAB

List of Experiments:

1. Working with nodes
2. Working with Chrome Keying
3. Working on Rotoscoping
4. Human Rotoscoping
5. Animal Rotoscoping
6. Object adding or removing with the Paint
7. Day to night converting + Color Correction
8. 3D Compositing in live-action short
9. Working with Hair Rotoscoping
10. Tracking and Stabilizing

Subject: CLOUD COMPUTING (MINOR)

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	II	1	Computer Networks	3	3
			Computer Networks Lab	2	1
II	III	2	Cloud Computing	3	3
			Cloud Computing Lab	2	1
	IV	3	AWS for Cloud Computing	3	3
			AWS for Cloud Computing Lab	2	1
		4	Data Mining and Data warehousing	3	3
			Data Mining and Data warehousing Lab	2	1
III	V	5	Python Programming	3	3
			Python Programming Lab	2	1
		6	Data Analytics Methods	3	3
			Data Analytics Methods Lab	2	1

II Semester

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3	0	0	3

COMPUTER NETWORKS

Course Outcomes: After this course, the student will be able to

1. Identify the different components in a Communication System and their respective roles.
2. Describe the fundamental concepts on data communication and the design of computer networks.
3. To get familiarized with the basic protocols of computer networks.
4. Describe the technical issues related to the local Area Networks
5. Identify the common technologies available in establishing LAN infrastructure.

UNIT- I:

Introduction to Network:- Definition, Applications, line configuration, Network topologies, Transmission mode, Types of Networks (LAN, WAN, MAN), Protocols, Network models: The OSI model, TCP/IP Protocol Suite.

Physical Layer: Signals –Analog signals, Digital signals, Transmission media - Guided & Un-Guided.

UNIT- II:

Network LAN Technologies: Ethernet, Fast Ethernet, Gigabit Ethernet, and Wireless LAN's

Data Link Layer: Error Detection and correction - Types of Errors, Error Detection, Error correction. Data link Protocols – Stop-and-wait ARQ, Go-back-n ARQ, Automatic Repeat Request (ARQ).

UNIT- III:

Network Devices: Modem, Hub, Switch, Router, Repeaters, bridges, Gateway

Network Layer: Internetwork Protocol (IP), Addressing (Classes, Dotted-decimal notation, Sample Internet), Subnet mask, Network layer Protocols – ARP, IPv4, and IPv6.

UNIT- IV:

Transport Layer: TCP protocol, UDP protocol, Process-to-Process delivery, Congestion: Congestion control, congestion avoidance, congestion discarding, Quality of Service (QOS).

UNIT-V:

Application Layer: Domain Name System (DNS) - domain name space, distribution of name space, DNS in the Internet, SMTP, SNMP, FTP, POP3, HTTP, WWW.

Text Books:

1. Data Communication and Computer Networks by Behrouz A. Forozoun, Published by Thomas MC GRAW HILL 2nd edition.
2. Andrew S. Tanenbaum, "Computer Networks", Fourth Edition, 2003
3. An introduction to computer network by PETER L DORODAL.

II Semester

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COMPUTER NETWORKS LAB

Course Outcomes: After this course, the student will be able to

1. Write HTML program to implement get( ) and post( ) methods
2. Describe the simple file transfer between two systems by opening socket connection to out server on one system and sending a file from one system to another.
3. To get familiarized with the basic protocols of computer networks.
4. Describe the technical issues related to the local Area Networks

Syllabus:

1. Write a program for print the IP Address of a WWW.YAHOO.COM
2. Write a program for to print the IP Address of the local machine and hostname.
3. Write HTML program to implement get( ) and post( ) methods
4. Write a program for to identify the well known ports on a Remote system.
5. Write a program for to print the parts of URL.
6. Write a program for to send & receive data from datagram packet.
7. Write a program for a chat application.
8. Write a program for the simple file transfer between two systems by opening socket connection to out server on one system and sending a file from one system to another.
9. Write a program for the HTTP server.

Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)

2. Student seminars (on topics of the syllabus and related aspects (individual activity))

3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))

4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted:

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

III Semester

L	T	P	C
3	0	0	3

CLOUD COMPUTING

Course Outcomes:

1. Compare the strengths and limitations of cloud computing
2. Identify the architecture, infrastructure and delivery models of cloud computing
3. Apply suitable virtualization concept.
4. Choose the appropriate cloud player, Programming Models and approach.
5. Address the core issues of cloud computing such as security, privacy and interoperability

UNIT- I:

Introduction to Cloud Computing: Evolution and History of Cloud Computing, Introduction to Cloud Computing, Why Cloud Computing is Becoming Highly Important, Features of Cloud Computing, Cloud Computing for various users, Advantages of Cloud Computing, Limitations of Cloud Computing.

UNIT- II:

Cloud Models and Types: The NIST Model, Cloud Cube Model, Deployment Models, Service Models. Layers and Types of Cloud, Components of Cloud Computing, Cloud Computing Service Providers

Software as a Service (SaaS): Software as a Service , Evolution of SaaS ,Brief Introductory part of Software as a Service , SaaS Unification Technologies , SaaS Integration Products and Technologies, SaaS Product Selection Criteria, SaaS Integration Services, Advantages of SaaS

UNIT- III:

Platform as a Service (PaaS): Introduction to PaaS, Evolution of PaaS, PaaS Service Providers- Acquia Cloud, Amazon AWS, Amazon Elastic Beanstalk, Google App Engine, Force.com, PaaS Application Framework, PaaS Operator Verbs, PaaS Developer Verbs, Advantages and Challenges of PaaS

UNIT- IV:

Infrastructure as a Service (IaaS): Evolution, IaaS Architecture- Advantages and Disadvantages of Infrastructure as a Service, SAN model, IaaS Providers, IaaS Architecture, Advantages and Disadvantages of Infrastructure as a Service

Data in Cloud: Evolution of Network Storage in Cloud, Data as a Service, Database as a Service, Cloud Based Data Storage, Advantages and Limitations of Cloud Based Storage Solution, Cloud Based Data Storage Service Providers

UNIT-V

Virtualization: Introduction to Virtualization and its Technical Evolution, History of Virtualization, Types of Virtual Machines, Advantages of Virtualization, Components of Virtualization, Types of Virtualization

Text Books:

1. Handbook of Cloud Computing By Dr.Anand Nayyar (Editor), First Edition 2019, BPB Publication, India
2. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter TATA McGraw- Hill , New Delhi – 2010
3. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
4. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
5. Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press
6. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammaraiselvi, TMH

III Semester

L	T	P	C
0	0	2	1

CLOUD COMPUTING LAB

Course Outcomes:

1. Installing and using identity management feature of OpenStack.

2. Installing and using security feature of own Cloud.

3. Installing and using Administrative features of own Cloud.

4. Design Cloud Services and Set a private cloud

5. Installing and using JOSSO.

Syllabus:

1. Create a word document of your class time table and store locally and on cloud with doc and pdf format.
2. Prepare a PowerPoint on cloud on topic of your choice.
3. Create your resume in a neat format using Google and Zoho cloud
4. Install OpenStack and use it as Infrastructure as a Service and use technology ownCloud.
5. Installing and using identity management feature of OpenStack.
6. Write a program for web feed using PHP, HTML.
7. Installing and using JOSSO.
8. Installing and using security feature of own Cloud.
9. Installing and using Administrative features of own Cloud.
10. Case study on Amazon EC2.
11. Case study on Microsoft azure.

References:

1. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008

2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.

3. Cloud Computing, A Hands on approach, ArshadeepBahga, Vijay Madisetti, University Press

4. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammaraiselvi, TMH

Co-Curricular Activities:

Suggested Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted:

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

IV Semester

L	T	P	C
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AWS FOR CLOUD COMPUTING

Course Outcomes:

After completing this course, the student will be able to

1. Configure various virtualization tools such as Virtual Box, VMware workstation. Design and deploy a web application in a PaaS environment.
2. Learn how to simulate a cloud environment to implement new schedulers.
3. Install and use a generic cloud environment that can be used as a private cloud.
4. Manipulate large data sets in a parallel environment.

UNIT- I:

Introduction: Definition of Cloud – Evolution of Cloud Computing – Benefits of Cloud Computing - Underlying Principles of Parallel and Distributed Computing – Cloud Characteristics – Elasticity in Cloud – On-demand Provisioning.

UNIT- II:

Cloud Enabling Technologies: Service Oriented Architecture – REST and Systems of Systems – Web Services – Publish Subscribe Model – Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures-Tools and mechanisms.

UNIT- III:

Virtualization of CPU – Memory – I/O Devices –Virtualization Support and Disaster Recovery, Cloud Architecture & Services: Layered Cloud Architecture Design –Public, Private and Hybrid Clouds -Cloud computing models: laaS – PaaS – SaaS, cloud delivery models, cloud deployment models.

UNIT- IV:

AWS & Networking: Introduction to AWS, AWS Global infrastructure, Google cloud platform, network switches & virtual private cloud (VPC) , VPC and Subnets , IP addressing in AWS, AWS security groups, EC2 instance types. EC2 pricing models

UNIT-V:

Cloud storage: Cloud Storage –Advantages of Cloud Storage – Cloud Storage Providers – S3 (Simple Storage Service) - S3 Features.

Security in cloud: Software-as-a-Service Security – Security Governance – Virtual Machine Security-Security types: network level, host level, application level.

Text Books:

1. Kai Hwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. Overview of AWS : AWS whitepaper , copyright@aws,inc, and/or its affiliates. BY AWS.
3. Rittinghouse, John W., and James F. Ransome, ―Cloud Computing: Implementation, Management and Security‖, CRC Press, 2017.
4. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, ―Mastering Cloud Computing‖, Tata Mcgraw Hill, 2013.
5. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing - A Practical Approach‖, Tata Mcgraw Hill, 2009.
6. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice)‖, O'Reilly, 2009.

IV Semester

L	T	P	C
3	0	0	3

AWS FOR CLOUD COMPUTING LAB

Course Outcomes:

After completing this course, the student will be able to

1. Configure various virtualization tools such as Virtual Box, VMware workstation. Design and deploy a web application in a PaaS environment.
2. 2.Able to Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or Windows 8.
3. Able to Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
4. Able to Install Google App Engine. Create hello world app and other simple web applications using python/java.
5. Able to Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim

Syllabus:

1. Install Virtualbox/VMware Workstation with different flavours of linux or windows OS on top of windows7 or Windows 8.
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
3. Install Google App Engine. Create hello world app and other simple web applications using python/java.
4. Use GAE launcher to launch the web applications.
5. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.
7. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
8. Install Hadoop single node cluster and run simple applications like word count

References:

1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, ―Mastering Cloud Computing‖, Tata Mcgraw Hill, 2013.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing - A Practical Approach‖, Tata Mcgraw Hill, 2009.
3. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice)‖, O'Reilly, 2009.

Co-Curricular Activities:

Suggested Co-Curricular Activities:

(Co-curricular activities shall not promote copying from textbook or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Student seminars (on topics of the syllabus and related aspects (individual activity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS:

Some of the following suggested assessment methodologies could be adopted:

1. The oral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Viva voce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

IV Semester

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DATA MINING AND DATA WAREHOUSING LAB

Course Outcomes:

1. To understand data mining concepts.
2. To learn Data mining techniques and algorithms.
3. Comprehend the data mining environments
4. Characterize the various kinds of patterns that can be discovered by association rule mining.
5. Evaluate mathematical methods underlying the effective application of data mining.

UNIT- I:

Data Warehousing: Introduction, What is Data Warehouse? Definition, Multidimensional Data Model, **OLAP** Operations, Warehouse Schema, Data Warehouse Architecture, Warehouse Server, Metadata, OLAP Engine, Data Warehouse Backend Process, Other Features

Data Preprocessing, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation

UNIT- II:

Data Mining: What is Data Mining? Data Mining: Definitions, KDD vs Data Mining, DBMS vs DM, Other Related Areas, DM Techniques, Other Mining Techniques, Issues and Challenges in DM, DM Applications- Case Studies

Association Rules: What is an Association Rule?, Methods to Discover Association Rules, A Priori Algorithm, Partition Algorithm, Pincer-Search Algorithm, Dynamic Itemset Counting Algorithms, FP-Tree Growth Algorithm, Discussion on Different Algorithms, Incremental Algorithms, Border Algorithms, Generalized Association Rule, Association Rules with Item Constraints

UNIT- III:

Clustering Techniques: Clustering Paradigms, Partitioning Algorithms, k-Medoid Algorithms, CLARA, CLARANS, Hierarchical Clustering, DBSCAN, BIRCH, CURE, Categorical Clustering Algorithms, STIRR, ROCK, CACTUS,

UNIT- IV:

Decision Trees: What is a Decision Tree?, Tree Construction Principle, Best Split, Splitting Indices,

Splitting Criteria, Decision Tree Construction Algorithms, CART, ID3, C4.5, Decision Tree Construction with Presorting, RainForest, Approximate Methods, CLOUDS, BOAT, Pruning Techniques, Integration of Pruning and Construction, Ideal Algorithm

UNIT-V:

Other Techniques: What is a Neural Network?, Learning in NN, Unsupervised Learning, Data Mining Using NN: A Case Study, Genetic Algorithms, Rough Sets, Support Vector Machines **Web Mining:** Web Mining, Web Content Mining, Web Structure Mining, Web Usage Mining, Text Mining, Unstructured Text, Episode Rule Discovery for Texts, Hierarchy of Categories, Text Clustering

Text Books:

1. Data Mining Techniques, Arun K Pujari, University Press
2. Data Mining: Concepts and Techniques, 3rd Edition, Jiawei Han, Micheline Kamber, Jian Pei

IV Semester

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DATA MINING AND DATA WAREHOUSING LAB

Course Outcomes:

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

1. Apply preprocessing techniques on real world datasets
2. Apply apriori algorithm to generate frequent item sets.
3. Apply Classification and clustering algorithms on different datasets. Note: Use python library scikit-learn wherever necessary

Syllabus:

1. Demonstrate the following data preprocessing tasks using python libraries. a) Loading the dataset b) Identifying the dependent and independent variables c) Dealing with missing data

2. Demonstrate the following data preprocessing tasks using python libraries. a) Dealing with categorical data b) Scaling the features c) Splitting dataset into Training and Testing Sets

3. Demonstrate the following Similarity and Dissimilarity Measures using python a) Pearson's Correlation b) Cosine Similarity c) Jaccard Similarity d) Euclidean Distance e) Manhattan Distance

4. Build a model using linear regression algorithm on any dataset.

5. Build a classification model using Decision Tree algorithm on iris dataset

6. Apply Naïve Bayes Classification algorithm on any dataset

7. Generate frequent item sets using Apriori Algorithm in python and also generate association rules for any market basket data.

8. Apply K- Means clustering algorithm on any dataset.

9. Apply Hierarchical Clustering algorithm on any dataset.

10. Apply DBSCAN clustering algorithm on any dataset.

References:

1. Introduction to Privacy-Preserving Data Publishing: Concepts and Techniques , Benjamin C.M. Fung, Ke Wang, Ada Wai-Chee Fu, Philip S. Yu
2. Data Mining: Concepts, Models and Techniques , Florin Gorunescu (auth.)

Co-Curricular Activities:

Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on tools and techniques.
5. Visits to technology facilities, firms, research organizations etc.
6. Invited lectures and presentations on related topics by field/industrial experts.

V Semester

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PYTHON PROGRAMMING

Course Outcomes:

1. Develop and execute simple Python programs.
2. Structure a Python program into functions.
3. Using Python lists, tuples to represent compound data
4. Develop Python Programs for file processing
5. Understand the inheritance concepts

UNIT- I:

Introduction to Python, Python, Features of Python, Execution of a Python, Program, Writing Our First Python Program, Data types in Python. Python Interpreter and Interactive Mode; Values and Types: int, float, boolean, string, and list; Variables, Expressions, Statements, Tuple Assignment, Precedence of Operators, Comments; Modules and Functions, Function Definition and use, Flow of Execution, Parameters and Arguments.

UNIT- II:

Operators in Python, Input and Output, Control Statements, Boolean Values and operators, Conditional (if), Alternative (if-else), Chained Conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful Functions: Return Values, Parameters, Local and Global Scope, Function Composition, Recursion.

UNIT- III:

Arrays in Python, Strings and Character,. Strings: String Slices, Immutability, String Functions and Methods, String Module; Lists as Arrays. Illustrative Programs: Square Root, gcd, Exponentiation, Sum an Array of Numbers, Linear Search, Binary Search.

UNIT- IV

Functions, Lists and Tuples, List Operations, List Slices, List Methods, List Loop, Mutability, Aliasing, Cloning Lists, List Parameters; Tuples: Tuple Assignment, Tuple as Return Value; Dictionaries: Operations and Methods; Advanced List Processing - List Comprehension; Illustrative Programs: Selection Sort, Insertion Sort, Merge sort, Histogram.

UNIT-V:

Files and Exception: Text Files, Reading and Writing Files, Format Operator; Command Line Arguments, Errors and Exceptions, Handling Exceptions, Modules, Packages; Illustrative Programs: Word Count, Copy File.

Text Books:

1. Mark Lutz, Learning Python
2. Tony Gaddis, Starting Out with Python

V Semester

L	T	P	C
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PYTHON PROGRAMMING LAB

Course Outcomes:

1. Foundation to write and understand Python code
2. Learners will understand how to break down complex problems into smaller, manageable tasks
3. Understand how to design and implement classes, objects
4. Inheritance hierarchies, enabling them to build more complex and scalable programs.
5. Acquire skills to work with data structures like lists, dictionaries, and tuples

Syllabus:

1. Write a Python program to convert temperatures to and from Celsius, Fahrenheit.
2. Write a Python program that accepts a word from the user and reverse it
3. Write a Python program to get the Fibonacci series between 0 to 50.
4. Write a Python program to find the square root of a number.
5. Write a Python program that accepts a string and calculate the number of digits and letters
6. Write a Python program to check whether an alphabet is a vowel or consonant
7. Write a Python program to calculate the sum and average of n integer numbers
8. Write a Python program to create the multiplication table (from 1 to 10) of a number
9. Write a Python function to find the Max of three numbers.
10. Write a Python function to calculate the factorial of a number (a non-negative integer). The function accepts the number as an argument.
11. Write a Python function that takes a number as a parameter and check the number is prime or not.
12. Write a Python function to check whether a number is perfect or not.
13. Write a Python function that checks whether a passed string is palindrome or not.
14. Write a Python program for sequential search.

References:

1. Kenneth A. Lambert, Fundamentals of Python

2. James Payne, Beginning Python using Python 2.6 and Python

Co-Curricular Activities:

Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments
3. Seminars, Group discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on tools and techniques.
5. Visits to technology facilities, firms, research organizations etc.
6. Invited lectures and presentations on related topics by field/industrial experts.

V Semester

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DATA ANALYTICS METHODS

Course Outcomes:

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

1. Ability to distinguish between discrete and continuous distributions.
2. Knowledge related to concept of curve fitting.
3. Knowledge of important discrete and continuous distributions such as Binomial, Poisson, rectangular , normal, distributions.
4. Acumen to apply standard discrete and continuous probability distributions to different situations.
5. Knowledge of correlation, regression analysis, regression diagnostics.

UNIT – I:

Correlation: Introduction, Meaning of Correlation, Types of correlation ,probable error, Karl- pear sons coefficient of correlation for individual series only, Spearman's Rank correlation for individual series only.

UNIT –II:

Regression: Introduction, definition, difference between correlation and regression, Simple linear regression, properties of regression coefficients, Regression equation x on y, Regression equation yon x, Simple Problems.

UNIT – III:

Estimation Techniques: Forward Differences - Backward differences. Newton's forward interpolation formula - Newton's backward interpolation formula

UNIT – IV:

Curve Fitting: method of least squares, fitting of a straight line only. Linear trend and find trend values by the method of straight line trend.

UNIT –V

Applications of Numerical Integration: Trapezoidal rule, Simpson's $1/3^{rd}$ rule, Simpson's $3/8^{th}$ rule.

Note: Concentration on numerical problems only. Proofs of theorems and Derivations of expressions are omitted.

Text Books:

1. Mathematical Methods by Dr. T. K. V. Iyengar. - S. Chand Publications.
2. Statistical methods - S.P Gupta.

Reference Books:

1. Fundamentals of Mathematical statistics - S.C. Gupta & V. K. Kapoor.

V Semester

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DATA ANALYTICS METHODS LAB

Syllabus:

1. Trapezoidal rule
2. Simpson's rule
3. Fitting of a Straight Line.
4. Fitting of a Straight Line Trend.
5. Estimation Techniques
6. Interpolation.
7. Rank Correlation.
8. Correlation coefficient.
9. Regression lines X on Y.
10. Regression lines Y on X.

Subject: Multimedia (MINOR)

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
	II	1	Graphic Design	3	3
			Graphic Design Lab	2	1
II	**III**	2	Introduction to 3D	3	3
			Introduction to 3D Lab	2	1
	IV	3	Fundamentals of Filmmaking	3	3
			Fundamentals of Filmmaking Lab	2	1
		4	Nuendo	3	3
			Nuendo Lab	2	1
III	**V**	5	Story Board Design	3	3
			Story Board Design Lab	2	1
		6	Character Animation	3	3
			Character Animation Lab	2	1

II Semester

L	T	P	C
3	0	0	3

GRAPHIC DESIGN

Course Outcomes: Students after successful completion of this course will be able to:

1. Understanding Design Principles
2. Proficiency in Design Software
3. Conceptualization and Ideation
4. Digital Imaging and Photo Editing
5. Presentation and Professional Skills

UNIT – I:

Introduction to Graphic Design: Introduction to Multimedia , key elements of multimedia, applications of multimedia, hardware and software requirements of multimedia, introduction to Graphic Design, what is Raster Graphic & Vector Graphic, Uses & Difference between Raster Graphic & Vector Graphics

UNIT – II:

Photoshop: Getting started with Photoshop, page layout and back ground, Photoshop program window-title bar, menu bar, options bar, image window, image title bar, Status bar, ruler, palettes, tool box, screen modes, saving files, reverting files, closing files.

UNIT – III:

Working with images - image size and resolution, image editing, colour modes &adjustments, back grounds.

UNIT – IV:

Making selections –lasso tools, sections tools, polygon lasso tool, magnetic lasso tool, magic hand tool, grow and similar commands, moving a portion of image, editing selections, fillinga selection, transforming selection, painting, drawing and retouching tools.

UNIT – V:

Layers and Filters : layers, type tool, converting layers, image masking, filters – the filter menu, artistic

filter, blur filter, brush store filters, distort filters, noise filters, pixelate filter, lighting effects, difference clouds, sharpen filters, printing. Web based Photoshop: Web template designing, buttons, tittles, back grounds, etc.

SKILL OUTCOMES: Students after successful completion of this course will be able to:

1. Layout and Composition
2. Visual Communication
3. think creatively, and come up with innovative solutions
4. work on projects and assignments that will enable you to build a strong portfolio

II Semester

L	T	P	C
0	0	2	1

GRAPHIC DESIGN LAB

Syllabus:

Commercial Work: Photo base multi-color visiting card – Multi color wedding cards – Paper adds (Photo base) Pomp lets (Photo base) Broachers (Photo base) –Advertisement designing – Pomp lets (Photo base) – Broachers (Photo base).

Digital Work: Pass port designing, Maxi Modeling, Digital Modeling - Black and White Photo Color conversation, Marriage album designing.

Flex Modeling: Front light board designing, back light board designing.

References:

1. "Graphic Design School: The Principles and Practice of Graphic Design" by David Dabner, Sandra Stewart,and Eric Zempol
2. "How to be a Graphic Designer without Losing Your Soul" by Adrian Shaughnessy
3. "Graphic Design: The New Basics" by Ellen Lupton and Jennifer Cole Phillips

Co-Curricular Activities:

1. Seminars, Group Discussions, Quizzes and Debates etc.
2. Workshops and Demonstrations
3. Design Competitions
4. Inviting guest speakers from the graphic design industry can expose students to real-world experiences and insights
5. Design Workshops and Projects

III Semester

L	T	P	C
3	0	0	3

INTRODUCTON TO 3D

Course Outcomes:

Students after successful completion of this course will be able to:

Use these tools to build complex objects then learn the basic 3D rendering tools and techniques including camera settings. Expose to all relevant aspects of CG creating with 3D Software.

UNIT-I:

Introduction to the interface of Maya, Menu set, Main Menu Bar, Panel Menu, The Channel Box and Layer Editor, Shelf, Hotkeys, Viewport, Attribute Editor, Hot Box, Setting and Preferences, New, Set Project, About Polygons, Creating Polygon primitives, Cameras, Edit Selections: Selection, Move, Scale, Rotate, Lasso tools - Creating New Shelf, Duplicating objects, Pivot points, Snapping, Outline.

UNIT-II:

NURBS, CV, EP, Bezier, Pencil Curve tools. Props Modeling - Modeling a high poly model, Mesh Conversion: Polygon to Nurbs, Nurbs to polygon, Highpoly, Low Poly, viewport references, Model using Reference images, basic posture, Difference between hi- poly & low- poly characters.

UNIT-III:

Introduction to basic material types & Procedurals, Study of concepts: Opacity, Transparency, Specularity and color, Working with Transparency, Reflection & Refraction, Bump & Displacement Maps, Introduction to unwrapping, Unwrapping the maps for various 3d characters. Working with 2D Textures and 3D, Texture, Introduction to the mapping and Normal Maps, Shadow maps, Ray traced shadows.

UNIT-IV:

Lighting, Working with Maya Lights 1-Point, Direct, Spot, Working with Maya Lights 2- Ambient, Area and Volume, Direct Illumination-Creating and Illuminating a Stage Show, Three Point Lighting and Exterior Lighting, Cast shadows, decay rate, Previewing lighting and shadows creating depth map Shadow, creating ray-traced

UNIT-V:

Concept of a lighting system and shadows, Creating area light shadows, setting area light visibility, Creating softshadows with spotlights, Indirect lighting: Setting illumination for interiors, Tuning global illumination, rendering an AVI, Rendering an image sequence. Render layers: introduction, creating, Applying to render layer presets, setting overrides, creating render layer composites, Render Passes: Introduction, compare render passes and render layers, Render quality: anti-aliasing, setting color profiles, diagnosing ray tracing, adjust motion blur.

SKILL OUTCOMES: Students after successful completion of this course will be able to:

- Understand the virtual 3D space and how to build objects
- Create objects using primitive shapes and sub patch geometry
- Analyze the importance of file backup and management (projects setup) Evaluate the projects and assignments developed/prepared by the students

III Semester

L	T	P	C
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INTRODUCTON TO 3D LAB

1. Create any Model some objects such as chairs, tables, fruits, utensils
2. Create any Model instruments, tools
3. Create any Model of Cars or Bike,
4. Create any model of the male or female character.
5. Create any Model of any animal.
6. Create any Model of any birds, fishes, and worms.
7. Apply basic material and shader types & Procedurals textures.
8. Unwrap the models of objects and characters using various projection maps.
9. Apply texture on various objects and characters.
10. Create a natural outdoor or indoor scene.

References:

1. Digital Modeling Book by William Vaughan
2. Advanced Maya Texturing and Lighting Book by Lee Lanier

Co-Curricular Activities:

- Presentation on Modeling, Texturing Rendering, and popular workflow
- Demonstrate or Exhibit(museum) developed projects
- Group discussion on 2D, 2.5D & 3D
- Study tour or Visit to production house to get knowledge on the 3D pipeline
- Exhibit on the external and internal models with a team project

IV Semester

L	T	P	C
3	0	0	3

FUNDAMENTALS OF FILM MAKING

Learning Outcomes: Students after successful completion of this course will be able to:

1. Understanding the Language of Film
2. Proficiency in Technical Skills
3. Scriptwriting and Storytelling
4. Cinematography and Camera Techniques
5. Film Analysis and Critique

UNIT-I:

The history of Indian cinema and world cinema, the film making fundamentals, what is a role of a film maker, the film industry in India, the art and science of film making, the technology and equipments, introduction to script development: how to write a good script, inspiration to a story, research, commercial storytelling, how to work on a project, time management

UNIT-II:

Research material for script development, interesting journals; inspirational music: how to let your mind free, ready to strike ideas when they hit; surf internet; research by studying the time period; characters, customs, fashions, technologies, values of the world, how to make yourself organized, find a quiet place, ambience which will make you inspire, avoid needless distraction, writing is a part of focus, be prepared with note pad; developing a premise: the set is to develop story structure for the movie, Fiction or nonfiction genre format plot type.

UNIT-III:

Working with the writer, story structure, preproduction: breaking down the script determining the budget; securing the financing, scouting locations, casting; hiring the crew; securing equipment; scheduling the shoot dates

UNIT-IV:

Establish home base where production efforts can be coordinated. resources for the set up; legal consultations, budgeting: choose a business formula; plan; form a company, getting the appropriate quote

for equipment's, locations, personnel, cast and crew, shape the budget; working with the line producer; tips to keep budget low.

UNIT-V:

lining the script; scene breakdown sheets; determine the number of shooting days; making the daily schedule; finalizing the schedule; production process, introduction to location design, finding location; securing a location community relations; film commissions ; during production

SKILL OUTCOMES: Students after successful completion of this course will be able to:

1. Understanding the film production process
2. Scriptwriting and storytelling
3. Camera operation and cinematography
4. Production design and art direction

IV Semester

L	T	P	C
0	0	2	1

FUNDAMENTALS OF FILM MAKING LAB

Syllabus:

- Single short film
- Process film
- Visual continuity film
- Observation film
- Short film (2 to 3 minutes)

References:

1. The filmmaker's handbook: a comprehensive guide for the digital age (2013 edition) by Steven ascher and Edward pincus
2. Directing: film techniques & aesthetics (fifth edition, 2013) by Michael rabinger and Mickhurbis-cherrier

Co-Curricular Activities:

- The teacher can guide students in understanding screenplay structure
- Assign film analysis projects to students
- camera angles, lighting, composition, and other technical aspects of film making
- Guest lectures and industry visits
- Film festivals and showcases

IV Semester

L	T	P	C
3	0	0	3

NUENDO

Learning Outcomes: Students after successful completion of this course will be able to:

1. Understanding of Nuendo Interface
2. will learn how to effectively record and edit audio using Nuendo
3. Nuendo offers powerful MIDI sequencing capabilities
4. will learn about the principles and techniques of audio mixing using Nuendo
5. Post-Production and Sound Design

UNIT – I:

Introduction to Nuendo, The Getting Started, System requirements and installation, Minimum requirements, hardware installation, setting up system for audio production, hardware and its drivers.

UNIT – II:

Recording audio - Creating a new project, Setting up the VST Connections, Level settings and recording, Playback, Recording modes with cycle off, Cycle recording, Stacked recording

UNIT – III:

Editing audio - Event operations, Event envelopes, processing audio, recording and editing MIDI, Introduction, Creating an Instrument Track, Browsing sounds, MIDI recording, MIDI playback, recording modes with cycle off, Cycle recording, The Key Editor, The Controller lane

UNIT – IV:

Working with loops - Loop Browser, Adding loops, making copies, Insert into Project, external MIDI instruments, setting up MIDI devices, setting up VST connections for external instruments, Monitoring external MIDI instruments, Recording MIDI and external instruments

UNIT – V

Mixing and effects – Introduction, Setting levels, Setting pan, Mute and solo, Adding EQ, Audio effects,

About automation, Exporting, Surround production, Surround busses, Setting up a surround mix, Recording in surround, Exporting a surround file.

SKILL OUTCOMES: Students after successful completion of this course will be able to:

1. Audio Recording and Editing
2. MIDI Sequencing and Virtual Instruments
3. Audio Effects and Processing
4. Post-production for Film and Video

IV Semester

L	T	P	C
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NUENDO LAB

Syllabus:

- Recording audio
- Editing audio
- Recording and editing MIDI
- Working with loops
- Mixing and effects
- Surround production

References:

1. "Nuendo Power!" by Robert Guérin
2. "The Mixing Engineer's Handbook" by Bobby Owsinski
3. "Mixing and Mastering with Cubase" by Matthew Loel T. Hepworth
4. Online Courses and Video Tutorials: Platforms like Udemy, LinkedIn Learning, and YouTube offer awide range of Nuendo courses and video tutorials created by industry professionals

Co-Curricular Activities:

1. Seminars, Group Discussions, Quizzes and Debates etc.
2. Invite industry professionals or experienced sound engineers to deliver guest lectures or workshops
3. Peer Learning Sessions
4. Organize visits to professional recording studios or sound production facilities

V Semester

L	T	P	C
3	0	0	3

STORY BOARD DESIGN

Learning Outcomes: Students after successful completion of this course will be able to:

1. Understanding the Purpose of Storyboarding
2. Knowledge of Storytelling Techniques
3. Mastery of Visual Communication
4. Collaboration and Communication Skills
5. Time Management and Deadline Adherence

UNIT – I:

Studying colors and color mediums to understand the formal structure of color through analysis of color theory and notation.

UNIT – II:

Experience of color through experiments in various mediums: Poster colors, water colors, Pastels, Acrylic, Color Harmonies: Complementary, Split Complementary, Warm Colors, Cool Colors, Hue, Tint and Shades etc.

UNIT – III:

Sketching: Indoor and outdoor Studies, Landscape in pencil Crayons, Pen and ink, Water Color, Poster colors etc, Introduction to gesture drawings, Quick Figures, 5-minute figure studies.

UNIT – IV:

Story Boarding: To understand the formal structure of story through storyboard drawings, creating storytelling images, working with single images to tell stories and do gag drawings, Structuring a scene, Finding ways to have progression and punctuation in a sequence.

UNIT – V:

Cartoon Character Anatomy: Cartoon Drawing, Proportions, Weight and Balance, Stick figures, Gesture drawing, Expressions.

SKILL OUTCOMES: Students after successful completion of this course will be able to:

1. learn how to communicate ideas visually using various techniques such as composition
2. Sketching and Illustration
3. learn about composition, color theory, typography, and other elements that contribute to visual aesthetics and readability
4. Production Process

V Semester

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STORY BOARD DESIGN LAB

Syllabus:

1. Exploring different types of storyboards (film, animation, advertising)
2. Studying the basic elements of a storyboard (frames, panels, camera angles, composition)
3. Understanding visual communication principles (lines, shapes, colors)
4. Learning to convey emotions and moods through visual elements
5. Practicing different drawing styles and techniques
6. Exploring different camera angles and their effects on storytelling
7. Studying shot composition techniques (rule of thirds, leading lines)
8. Analyzing the impact of camera movement on storyboarding
9. Refining and polishing the final storyboard

References:

1. The Storyboard Artist: A Guide to Freelancing in Film, TV, and Advertising" by Giuseppe Cristiano
2. Prepare to Board! Creating Story and Characters for Animated Features and Shorts" by Nancy Beiman
3. Storyboarding Essentials: SCAD Creative Essentials by David Harland Rousseau

Co-Curricular Activities:

1. Seminars, Group Discussions, Quizzes and Debates etc.
2. Assign students to work in teams on storyboard design projects
3. Arrange visits to relevant places such as animation studios
4. Workshops and Skill-building Sessions

V Semester

L	T	P	C
3	0	0	3

CHARACTER ANIMATION

Learning Outcomes: Students after successful completion of this course will be able to:

1. Understanding Animation Principles.
2. Proficiency in 3D Animation Software
3. Animation Workflow and Pipeline

UNIT – I:

Terminology for 3D Animation: Timeline, Key frame, Frame rate, Poses, Line of action, Working with 3d Rigs: Importance of poses, Creation of poses from REFERENCES images, Importance of familiarizing with the rig's controllers, Understanding the body mechanics: COG (Center of gravity), Importance of line of action and balance in a pose, what is twinning? Silhouette and its application in creating a perfect pose, Positive and negative spaces

UNIT – II:

Setting up for animation using Animation Settings: Tangents, Auto Key, Animation Start/End, Playback Start/End, Playback Speed etc, Concept of pose-to-pose in 3D animation?

Animation passes: Pass 1Blocking, Pass 2-Breakdowns, Pass 3-Inbetweens.

UNIT – III:

Principles of traditional animation applied to 3D computer animation: Squash and Stretch, Timing, Anticipation, Staging, Follow Through and Overlapping Action, Straight Ahead Action and Pose-to-PoseAction (Keyframes), Slow In and Out, Arcs, Exaggeration, Secondary action, Appeal

UNIT – IV:

Cycling Animation: Walk, Run, Sneak cycles, Sad walk, Happy walk, Jump. Using exposure sheets, Adjusting timing and spacing with dope sheet, Exercises in weight and mass, Secondary Action, Fast Action.

UNIT – V:

Animation constraints, Animating the body: Body language, Action, Reaction, Push and Pull, Lift, Throw, Discuss the use of video REFERENCESs in animation

SKILL OUTCOMES: Students after successful completion of this course will be able to:

1. Keyframe Animation
2. Lip Sync and Facial Animation
3. Acting and Performance
4. Scene Composition and Cinematography
5. Portfolio Development

V Semester

L	T	P	C
0	0	2	1

CHARACTER ANIMATION LAB

Syllabus:

- Camera setting for layout
- Camera animation
- Squash and Stretch
- Working with Trax Editor
- Throwing an axe
- Animating flying text
- Path animation
- Basic relationships: Constraints
- Basic relationships: Set – Driven key
- Working with full body IK animation rig

References:

1. The Storyboard Artist: A Guide to Freelancing in Film, TV, and Advertising" by Giuseppe Cristiano
2. Prepare to Board! Creating Story and Characters for Animated Features and Shorts" by Nancy Beiman
3. Storyboarding Essentials: SCAD Creative Essentials by David Harland Rousseau

Co-Curricular Activities:

1. Seminars, Group Discussions, Quizzes and Debates etc.
2. Assign students to work in teams on storyboard design projects
3. Arrange visits to relevant places such as animation studios
4. Workshops and Skill-building Sessions

Subject: Data Science (MINOR)

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	II	1	Introduction to Data Science and R Programming	3	3
			Introduction to Data Science and R Programming Lab	2	1
II	III	2	Python Programming for Data Analysis	3	3
			Python Programming for Data Analysis Lab	2	1
	IV	3	Data visualization using Tableau	3	3
			Data visualization using Tableau Lab	2	1
		4	Data visualization using python	3	3
			Data visualization using python Lab	2	1
III	V	5	Supervised Machine Learning with Python	3	3
			Supervised Machine Learning with Python Lab	2	1
		6	Unsupervised Machine Learning with Python	3	3
			Unsupervised Machine Learning with Python Lab	2	1

II Semester

L	T	P	C
3	0	0	3

INTRODUCTION TO DATA SCIENCE AND R

Aim and objectives of Course:

Data Science is a fast-growing interdisciplinary field, focusing on the analysis of data to extract knowledge and insight. This course will introduce students to the collection. Preparation, analysis, modelling and visualization of data, covering both conceptual and practical issues. Examples and case studies from diverse fields will be presented, and hands- on use of statistical and data manipulation software will be included.

Learning outcomes of Course:

- Recognize the various discipline that contribute to a successful data science effort.
- Understand the processes of data science identifying the problem to be solved, data collection, preparation, modeling, evaluation and visualization.
- Be aware of the challenges that arise in Data Sciences.
- Be able to identify the application of the type of algorithm based on the type of the problem.
- Be comfortable using commercial and open source tools such as the R/Python language and its associated libraries for data analytics and Visualization.

UNIT I:

Defining Data Science and Big data, Benefits and Uses, facets of Data, Data Science Process. History and Overview of R, Getting Started with R, R Nuts and Bolts

UNIT II:

The Data Science Process: Overview of the Data Science Process-Setting the research goal, Retrieving Data, Data Preparation, Exploration, Modeling, data Presentation and Automation. Getting Data in and out of R, Using reader package, Interfaces to the outside world.

UNIT III:

Machine Learning: Understanding why data scientists use machine learning-What is machine

learning and why we should care about, Applications of machine learning in data science, Where it is used in data science, The modeling process, Types of Machine Learning-Supervised and Unsupervised.

UNIT IV:

Handling large Data on a Single Computer: The problems we face when handling large data, General Techniques for handling large volumes of data, Generating programming tips fordealing with large datasets.

UNIT V:

Sub setting R objects, Vectorised Operations, Managing Data Frames with the dplyr, Control structures, functions, Scoping rules of R, Coding Standards in R, Loop Functions, Debugging, Simulation. Case studies on preliminary data analysis.

Text Books:

1. Davy Cielen, Arno. D. B. Maysman, Mohamed Ali, "Introducing Data Science" Manning Publications, 2016.
2. Roger D. Peng, "R Programming for Data Science" Lean Publishing, 2015.

Reference Books:

1. Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.
2. Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, "Practical Data Science Cookbook", Packt Publishing Ltd., 2014.

Web References for case studies:

1. https://www.kaggle.com/datasets

2. https://github.com/

II Semester

L	T	P	C
0	0	2	1

INTRODUCTION TO DATA SCIENCE AND R LAB

Lab/Practical/Experiments/Tutorials syllabus:

1. Installing R and R studio, with proper notes on version management, cosmetic settings and different libraries.
2. Basic operations in r with arithmetic and statistics.
3. Getting data into R, Basic data manipulation, Loading Data into R
4. Basic plotting
5. Loops and functions
6. Create Vectors, Lists, Arrays, Matrices, Data frames and operations on them.
7. Demonstrate the visualization and graphics using visualization packages like ggplot2.
8. Implement Loop functions with lapply(), sapply(), tapply(), apply(), mapply().
9. Explore data using Single Variables: Unimodal, Bimodal, Histograms, Density Plots, Bar charts
10. Explore data using two Variables: Line plots, Scatter Plots, smoothing cures, Bar charts
11. Explore and implement commands using dplyr package
12. Download a dataset and work on basic data manipulation followed by inferential statistics.

Recommended Text Books:

1. Mark Gardener, “Beginning R - The Statistical Programming Language”, John Wiley &Sons, Inc., 2012.
2. W. N. Venables, D. M. Smith and the R Core Team, “An Introduction to R”, 2013. Recommended Reference books:
3. The art of R Programming: A tour of Statistical Software design. Norman Matloff.Kindle Edition
4. The book of R : The first course in Programming and Statistics by Tilman M. Davies.

Recommended Co-curricular activities: (Co-curricular Activities should not promote copying from text book or from others’ work and shall encourage self/independent and group learning)

A. **Measurable**:

1. Assignments on:

2. Student seminars (Individual presentation of papers) on topics relating to:
3. Quiz Programmes on:
4. Individual Field Studies/projects:
5. Group discussion on:
6. Group/Team Projects on:

B. **General**

1. Collection of news reports and maintaining a record of paper-cuttings relating to topics covered in syllabus
2. Group Discussions on:

   Watching TV discussions and preparing summary points recording personal observations etc., under guidance from the Lecturers
3. Any similar activities with imaginative thinking.
4. Recommended Continuous Assessment methods:

III Semester

L	T	P	C
3	0	0	3

PYTHON PROGRAMMING FOR DATA ANALYSIS

Aim and objectives of Course:

- To be able to Program in Python
- To know and understand the data Analysis phases
- To know the usage of all libraries

Learning outcomes of Course:

- Understands and learn all basic concepts of
- Python Program Data Analysis methods in Python
- Get used with Python Programming environments

UNIT I:

What is Data Analysis? Differences between Data Analysis and Analytics, What is Python, Why Python for Data Analysis? What is Library, Essential Python Libraries, Python Language basics, I Python and Jupyter Notebook, Python Language Basics.

UNIT II:

Built-in Data Structures, Functions, Files and Operating System.

NumPy Basics: Arrays and Vectorized Computation, The Numpy ndarray, Universal Functions, Array-Oriented Programming with Arrays, File Input and Output with Arrays, Linear Algebra, Pseudorandom Number Generation.

UNIT III:

Getting Started with Pandas: Introduction to Pandas Data Structures, Essential Functionality, Summarizing and Computing Descriptive Statistics Data Loading, Storage and File Formats: Reading and Writing Data in TextFormat, Binary Data Formats, Interacting with Web APIs, Interacting with Databases.

UNIT IV:

Data Cleaning and Preparation: Handling Missing Data, Data Transformation, String Manipulation.

Data Wrangling: Join, Combine and Reshape: Hierarchical Indexing, Combining and Merging Datasets, Reshaping and Pivoting.

UNIT V:

Introduction to Modeling Libraries in Python: Interfacing between pandas and Model code, Creating model descriptions with Patsy, Introduction to stats models.

Plotting and Visualization: A brief matplotlib API Primer, Plotting with Pandas and Seaborn, Other Python visualization tools.

TEXT BOOKS:

1. Wes McKinney "Python for Data Analysis" O'reilly Publications Second edition
2. Charles R Suverance "Python for Everybody" Exploring data using Python 3

REFERENCE BOOKS:

1. John Zelle Michael Smith Python Programming, second edition 2010

Co-curricular Activities

Take up any application which involves the python coding. Example Case studies/Simulators: (https://knightlab.northwestern.edu/2014/06/05/five-mini-programming-projects-for-the- python-beginner/)

- Dice Rolling Simulator
- Guess the number
- Text based adventure game
- Hangman

Continuous assessment:

Let the students be tested in the following questions from each unit

1. What is Data Analysis? List out the differences between data analysis and data analytics.
2. What is Python? Explain Python basics.
3. Explain NumPy Basics.
4. What is Data Loading? Explain Pandas Data Structures.
5. What is Data Cleaning? Explain different phases in it.
6. Explain Plotting and Visualization in Python.

III Semester

L	T	P	C
0	0	2	1

PYTHON PROGRAMMING FOR DATA ANALYSIS LAB

1. Use matplotlib and plot an inline in Jupyter.
2. Implement commands of Python Language basics
3. Create Tuples, Lists and illustrate slicing conventions.
4. Create built-in sequence functions.
5. Clean the elements and transform them by using List, Set and Dict Comprehensions.
6. Create a functional pattern to modify the strings in a high level.
7. Write a Python Program to cast a string to a floating-point number but fails with Value Error on improper inputs using Errors and Exception handling.
8. Create an n array object and use operations on it.
9. Use arithmetic operations on Numpy Arrays
10. Using Numpy array perform Indexing and Slicing Boolean Indexing, Fancy Indexing operations
11. Create an image plot from a two-dimensional array of function values.
12. Implement some basic array statistical methods (sum, mean, std, var, min, max, argmin, argmax, cumsum and cumprod) and sorting with sort method.
13. Implement numpy.random functions.
14. Plot the first 100 values on the values obtained from random walks.
15. Create a data frame using pandas and retrieve the rows and columns in it by performing some indexing options and transpose it.
16. Implement the methods of descriptive and summary statistics
17. Load and write the data from and to different file formats including Web APIs.
18. Implement the data Cleaning and Filtering methods(Use NA handling methods, fill na function arguments)
19. Transform the data using function or mapping
20. Rearrange the data using unstack method of hierarchical Indexing
21. Implement the methods that summarize the statistics by levels.
22. Use different Join types with how argument and merge data with keys and multiple keys.

IV Semester

L	T	P	C
3	0	0	3

DATA VISUALIZATION

Aim and objectives of Course:

- To know the importance of data Visualization in the world of Data Analytics and Prediction
- To know the important libraries in Tableau
- To get equipped with Tableau Tool Learning

Course outcomes:

- Students should be able to visualize data through seven stages of data analysis process
- Should be able to do explanatory and hybrid types of data visualization
- Should be able to understand various stages of visualizing data

UNIT I:

Creating Visual Analytics with tableau desktop, connecting to your data-How to Connect to your data, What are generated Values? Knowing when to use a direct connection, Joining tables with tableau, blending different data sources in a single worksheet.

UNIT II:

Building your first Visualization- How Me works- Chart types, Text Tables, Maps, bar chart, Line charts, Area Fill charts and Pie charts, scatter plot, Bullet graph, Gantt charts, Sorting data in tableau, Enhancing Views with filters, sets groups and hierarchies.

UNIT III:

Creating calculations to enhance your data- What is aggregation, what are calculated values and table calculations, Using the calculation dialog box to create, Building formulas using table calculations, Using table calculation functions

UNIT IV:

Using maps to improve insights-Create a Standard Map View, Plotting your own locations on a map, Replace Tableau's standard maps, Shaping data to enable Point-to-Point mapping.

UNIT V:

Developing an Adhoc analysis environment- generating new data with forecasts, providing self evidence adhoc analysis with parameters, Editing views in tableau Server.

TEXT BOOKS:

1. Tableau your data-Daniel G. Murray and the Inter works BI team, Wiley Publications
2. Tableau Data Visualizaton Cookbook, Ashutosh Nandeshwar, PACKT publishing.
3. Storytelling with Data: A Data Visualization Guide for Business Professionals by Cole Nussbaumer Knaflic (2014)
4. ggplot2: Elegant Graphics for Data Analysis by Hadley Wickham (2009)

REFERENCE BOOKS:

1. Designing Data Visualizations: Representing Informational Relationships by Noah Iliinsky, Julie Steele (2011)
2. Alexandru C. Telea – "Data Visualization principles and practice" Second Edition, CRC Publications
3. Joshua N. Millign–" Learning Tableau -2019" – Third Edition- Packt publications

Student Activity

Create a sample super store data set and visualize the following requirements

General Requirements

1. Dashboard size is 1250px wide by 750px tall.
2. Prefer using containers
3. The dashboard has a total of 5 containers (no more, no less)
4. The Filter Pane
5. Each filter has some padding

Charts Pane Requirement

1. All 3 charts must be in one vertical container
2. Do proper formatting
3. Each chart has some padding between them and other objects
4. Each chart has a grey border, slightly darker than the Pane background color.
5. The Pane under the Title has a border

1. The second graph should have the title as "Sales" and should show monthly sales per year. Make sure it is an area chart with proper formatting.

2. The third graph should the title as "Profit" and should show monthly profit per year. Make sure it is an area chart with proper formatting.

Continuous assessment:

Let the students be tested in the following questions from each unit

1. What are generated values? Join tables using Tableau
2. Create any visualization charts using Chart types, Text Tables, Maps, barchart, Line charts, Area Fill charts and Pie charts, scatter plot etc.,
3. What is aggregation, what are calculated values and table calculations?
4. Using Standard Map View, Plot your own locations on a map
5. Develop an Adhoc analysis environment.

IV Semester

L	T	P	C
0	0	2	1

DATA VISUALIZATION LAB

1. Connect to data Sources
2. Create Univariate Charts
3. Create Bivariate and Multivariate charts
4. Create Maps
5. Calculate user-defined fields
6. Create a workbook data extract
7. Save a workbook on a Tableau server and web
8. Export images, data.

IV Semester

L	T	P	C
3	0	0	3

DATA VISUALIZATION USING PYTHON

Course Objective:

This course introduces students to data analysis and visualization inthe field of exploratory data science using Python.

Course Outcomes:

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

1. Use data analysis tools in the pandas library.
2. Load, clean, transform, merge and reshape data.
3. Create informative visualization and summarize data sets.
4. Analyze and manipulate time series data.
5. Solve real world data analysis problems.

UNIT-I:

Introduction: Introduction to Data Science, Exploratory Data Analysis and Data Science Process, Motivation for using Python for Data Analysis, Introduction of Python Jupyter Notebook.

Essential Python Libraries: NumPy, pandas, matplotlib, SciPy, scikit-learn, statsmodels, seaborn.

UNIT-II:

Getting Started with Pandas: Arrays and vectorized computation, Introduction to pandas Data Structures, Essential Functionality, Summarizing and Computing Descriptive Statistics, Data Loading, Storage and File Formats, Reading and Writing Data in Text Format, Web Scraping, Binary Data Formats, Interacting with Web APIs, Interacting with Databases Data Cleaning and Preparation. Handling Missing Data, Data Transformation, String Manipulation

UNIT-III:

Data Wrangling: Hierarchical Indexing, Combining and Merging Data Sets Reshaping and Pivoting.

Data Visualization matplotlib: Basics of matplotlib, plotting with pandas and seaborn, other python visualization tools, Advanced categorical and numeric plots.

UNIT-IV:

Data Aggregation and Group operations: Group by Mechanics, Data aggregation, General split-apply-combine, Pivot tables and cross tabulation

Time Series Data Analysis: Date and Time Data Types and Tools, Time series Basics, date Ranges, Frequencies and Shifting, Time Zone Handling, Periods and Periods Arithmetic, Resampling and Frequency conversion, Moving Window Functions.

UNIT-V:

Advanced Pandas: Categorical Data: cleaning data and visualization techniques, Advanced Group By methods, Use Techniques for Method Chaining.

TEXT BOOK:

1. McKinney, W.(2017). Python for Data Analysis: Data Wrangling with Pandas, NumPy and IPython. 2nd edition. O'Reilly Media.

REFERENCE BOOK:

1. O'Neil, C., & Schutt, R. (2013). Doing Data Science: Straight Talk from the Frontline O'Reilly Media.

IV Semester

L	T	P	C
0	0	2	1

DATA VISUALIZATION USING PYTHON LAB

1. Practicals based on NumPy ndarray
2. Practicals based on Pandas Data Structures
3. Practicals based on Data Loading, Storage and File Formats
4. Practicals based on Interacting with Web APIs
5. Practicals based on Data Cleaning and Preparation
6. Practicals based on Data Wrangling
7. Practicals based on Data Visualization using matplotlib
8. Practicals based on Data Aggregation
9. Practicals based on Time Series Data Analysis

V Semester

L	T	P	C
3	0	0	3

SUPERVISED ML WITH PYTHON

Aim and objectives of Course:

- The purpose of this course is to serve as an introduction to Supervised machine learning with Python.
- We will explore several classifications, regression algorithms and see how they can help us perform a variety of Supervised machine learning tasks.

Course outcomes:

- Able to understand introduction to machine learning concepts.
- Able to Loading datasets, build models and model persistence.
- Understand Feature extraction from data sets.
- Able to do Regression & Classification.
- Able to compare SVM with other classifiers.

UNIT I:

Machine Learning Basics: What is machine learning? Key terminology, Key tasks of machine learning, How to choose right algorithm, steps in developing a machine learning, why python? Getting started with Numpy library Classifying with k- Nearest Neighbors: The k-Nearest Neighbors classification algorithm, Parsing and importing data from a text file, Creating scatter plots with Matplotlib, Normalizing numeric values

UNIT II:

Splitting datasets one feature at a time-Decision trees: Introducing decision trees, measuring consistency in a dataset, using recursion to construct a decision tree, plotting trees in Matplotlib

UNIT III:

Classifying with probability theory-Naïve Bayes: Using probability distributions for classification, learning the naïve Bayes classifier, Parsing data from RSS feeds, using naïve Bayes to reveal regional attitudes

UNIT IV:

Logistic regression: Classification with logistic regression and the sigmoid function, Using optimization to find the best regression coefficients, the gradient descent optimization algorithm, Dealing with missing values in the our data

UNIT V:

Support vector machines: Introducing support vector machines, using the SMO algorithm for optimization, using kernels to “transform” data, Comparing support vector machines with other classifiers

TEXT BOOK:

1. Machine learning in action, Peter Harrington by Manning publications

V Semester

L	T	P	C
0	0	2	1

SUPERVISED ML WITH PYTHON LAB

Details of Lab/Practical/Experiments/Tutorials syllabus:

1. Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a CSV file. For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.
2. Write a program to demonstrate the working of the decision tree based ID3 algorithm.
3. Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a CSV file.
4. Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your dataset.

V Semester

L	T	P	C
3	0	0	3

UNSUPERVISED ML WITH PYTHON

Aim and objectives of Course (Unsupervised ML with Python):

- Unsupervised Machine Learning involves finding patterns in datasets.
- The core of this course involves study of Clustering, feature extraction and optimization algorithms.
- The purpose of this course is to serve as an introduction to machine learning with Python.

Course outcomes:

- Able to do Clustering, feature extraction and optimization.
- Students will be able to understand and implement in Python algorithmsof Unsupervised
- Machine Learning and apply them to real-world datasets.

UNIT-I:

Unsupervised Learning: Clustering: k-means clustering algorithm, Improving cluster performance with post processing, Bisecting k-means, Example: clustering points on a map

UNIT-II:

Association analysis : Apriori algorithm: Association analysis, The Apriori principle, Finding frequent item sets with the Apriori algorithm, Mining association rules from frequent item sets, uncovering patterns in congressional voting

UNIT-III:

Finding frequent item sets: FP-growth –FP trees, Build FP-tree, mining frequent from an FP- tree, finding co-occurring words in a Twitter feed, mining a click stream from a news site.

UNIT-IV:

Principal component analysis: Dimensionality reduction techniques, using PCA to reduce the dimensionality of semiconductor manufacturing data

UNIT-V:

Singular value decomposition: Applications of the SVD, Matrix factorization, SVD in Python, Collaborative filtering–based recommendation engines, a restaurant dish recommendation engine

TEXT BOOK:

1. Machine learning in action, Peter Harrington by Manning publications

V Semester

L	T	P	C
0	0	2	1

UNSUPERVISED ML WITH PYTHON LAB

Details of Lab/Practical/Experiments/Tutorials syllabus:

1. Implementation of K-Means Clustering
2. Implement the bisecting k-means clustering algorithm
3. Implement Apriori algorithm
4. Implement Association rule-generation functions
5. Implement FP-tree creation
6. Write a function to find all paths ending with a given item.
7. Implement Code to access the Twitter Python library
8. Implement the PCA algorithm
9. Write a program to find Rating estimation by using the SVD
10. Implement Image-compression

Subject: Cyber Forensics (MINOR)

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
I	II	1	Fundamentals of Computer	3	3
			Fundamentals of Computer Lab	2	1
II	III	2	Cyber Security	3	3
			Cyber Security Lab	2	1
	IV	3	Cyber Tools & Techniques	3	3
			Cyber Tools & Techniques Lab	2	1
		4	Digital Forensics	3	3
			Digital Forensics Lab	2	1
III	V	5	Mobile Forensics	3	3
			Mobile Forensics Lab	2	1
		6	Multimedia Forensics & Speaker Identification	3	3
			Multimedia Forensics & Speaker Identification Lab	2	1

II Semester

L	T	P	C
3	0	0	3

FUNDAMENTALS OF COMPUTER

Learning Objectives: The students will be able to understand the fundamentals of computers & networks.

Learning Outcomes: On successful completion of the course the student will be able to:

1. Demonstrate computer and its components
2. Identify basic input and output devices
3. Learn types of printers and their configuration
4. Assembling and dissembling of computer
5. Identify preventive maintenance and troubleshooting process

UNIT-I: Computer

Basics, History, Characteristics, Applications, Types, Components; Input/ Output Devices, Storage Devices, Peripheral Devices; Central Processing Unit- Input/Output Unit, Arithmetic Logical Unit, Control Unit, Memory Unit, Operating System & Types; Desktop icons and Control panel objects; Files and Folders.

UNIT-II: Networks

Computer Networks- Introduction, Characteristics, Types and Topologies; Types of Network Devices; Internet, Internet Service Providers and their connection types.

UNIT-III: Components of Computer & Printers

Computer Hardware-Power Supplies, Motherboards, Internal PC Components, External Ports and Cables; Selection of Computer Components; Lab safety Procedures; Procedures to Protect Equipment and Data; Proper use of tools- Software Tools, Antistatic Wrist Strap. Printers- Installing and configuring printers, Configuring Options and Default Settings, Maintenance and Troubleshooting of Printers, Troubleshooting Printer Issues, Common Problems and Solution.

UNIT-IV: Assembling and Dissembling of Computer

Computer Assembling- Installation of Motherboard, Drives, Cables and Adapter Cards; Dissembling the Computer- Cables, RAM, Motherboard, Heatsink, Hard drives; BIOS Beep Codes and Setup, BIOS and UEFI Configuration, Upgradation and Configuration of a computer.

UNIT-V: Preventive Maintenance and Troubleshooting

Preventive Maintenance and the Troubleshooting Process, Benefits, Tasks; Inspection of Internal Components; Problem in the Computer: Identification, Root Cause; Plan of Action, Resolution of the problem and implementation.

Suggested Readings

1. Introduction to IT essentials Version 6 by CISCO
2. Fundamentals of Computers by Balagurusamy.
3. Fundamentals of computers by Rajaraman
4. Computer Fundamentals Course by Anita Goel
5. Computer Fundamentals 6th Ed by P.K. Sinha
6. Fundamentals of Computers by Rajaraman V

Suggested Co-Curricular Activities

1. Making of hardware as project.
2. Workshop on Assembly and Disassembly of Computer.

II Semester

L	T	P	C
0	0	2	1

FUNDAMENTALS OF COMPUTER LAB

List of Experiments:

1. Identification of Input Devices
2. Identification of Output Devices
3. Creation of Folders.
4. Components of Computer and Printers
5. Dissemble of computer.
6. Computer Assembly
7. Creation of a word file and name as Network Devices.
8. Creation of a table and data entry.
9. Power Point presentation with 10 slides.
10. Power Point with various smart arts in it.

III Semester

L	T	P	C
3	0	0	3

CYBER SECURITY

Course Objectives: The students will be able to understand the securing the virtual space.

Course Outcomes: On successful completion of the course the student will be able to:

1. Understand the concept of Cyber security, issues and challenges associated with it.
2. Understand the cybercrimes, their nature, legal remedies and reporting the crimes through available platforms and procedures.
3. Appreciate various privacy and security concerns on online social media and understand the reporting procedure of inappropriate content, underlying legal aspects and best practices for the use of social media platforms.
4. Understand the basic concepts related to E-Commerce and digital payments. They will become familiar with various digital payment modes and related cyber security aspects, RBI guidelines and preventive measures against digital payment frauds.

UNIT- I: Cyber Space

Cyberspace: Definition, Architecture and Regulation; Overview of Web-technology; Internet: Advent of internet, World Wide Web, Internet infrastructure for data transfer and governance.

UNIT-II: Cyber Crimes

History & Development, Classification of cybercrimes- Cyber Terrorism, Cyber Threats, Cyber Stalking, Pornography, Child Pornography, Hacking, Viruses, Worms, Trojans, Malware, Scareware, Adware, Command and Control, Botnet, Cyber Trespass, Cyber Theft, Cyber Fraud, Password Cracking, Malware, Hunk Mail, Steganography, Cyber Terrorism, Cyber Warfare, Phishing, Impact of cybercrimes- Effect of cybercrimes on society, Cybercrimes against people, property, business and nation. Evaluation of cybercrimes, Definition of cyber criminals, Trends in cybercrime across India & the world.

UNIT- III: Cyber Security

Cyber security: Need and Importance, Overview, Cyber security Domains and Growth, The Cyber security Cube - Three Dimensions, CIA Triad, Confidentiality, The Principle of Confidentiality, Protecting Data Privacy, Controlling Access-Laws and Liability; Data Integrity: Principle, Need and Integrity Checks, Availability, The Principle of Availability, Ensuring Availability.

UNIT-IV: Social Media and Security

Social networks: Introduction and Overview, Opportunities, Pitfalls; Social media: Types, Platforms, Monitoring, Hashtag, Viral content, Marketing, Privacy, Challenges, Security issues, Flagging and reporting of inappropriate content, Laws regarding posting of inappropriate content, Best practices, Case studies.

UNIT- V: E-Commerce and Digital Payments

E- Commerce: Definition, Components, Security Elements, Threats, Security best practices. Digital payments: Introduction, Components, Modes (Banking Cards, Unified Payment Interface (UPI), e-Wallets, Unstructured Supplementary Service Data (USSD), Aadhar enabled payments), Frauds and Preventive measures, RBI guidelines on digital payments and customer protection in unauthorized banking transactions, Relevant provisions of Payment Settlement Act, 2007.

SUGGESTED READINGS

1. Cyber Crime Impact in the New Millennium, by R. C Mishra , Auther Press. Edition 2010.
2. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Sumit Belapure and Nina Godbole, Wiley India Pvt. Ltd. (First Edition, 2011) 3
3. Security in the Digital Age: Social Media Security Threats and Vulnerabilities by Henry A. Oliver, Create Space Independent Publishing Platform. (Pearson , 13th November, 2001)
4. Electronic Commerce by Elias M. Awad, Prentice Hall of India Pvt Ltd.
5. Cyber Laws: Intellectual Property & E-Commerce Security by Kumar K, Dominant Publishers.
6. Network Security Bible, Eric Cole, Ronald Krutz, James W. Conley, 2nd Edition, Wiley India Pvt. Ltd.
7. Fundamentals of Network Security by E. Maiwald, McGraw Hill.

SUGGESTED CO-CURRICULAR ACTIVITIES

1. Visiting of Cyber Crime Stations
2. Visiting of Cyber Crimes Tracking Network System
3. Visiting of National Crime Records Bureau

III Semester

L	T	P	C
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CYBER SECURITY LAB

List of Experiments:

1. VM Ware installations
2. Configuring security settings in Mobile Wallets and UPIs
3. Applying patches, fixing vulnerability (experiments)
4. Setting, configuring and managing three password policy in the computer (BIOS, Administrator and Standard User).
5. Setting and configuring two factor authentication in the Mobile phone.
6. Security patch management and updates in Computer and Mobiles.
7. Managing Application permissions in Mobile phone.
8. Installation and configuration of computer Anti-virus.
9. Installation and configuration of Computer Host Firewall.
10. Wi-Fi security management in computer and mobile.
11. Basic checklist, privacy and security settings for popular social media platforms.
12. Reporting and redressal mechanism for violations and misuse of social media platforms.
13. Windows memory acquisition using Dumpit Tool.

IV Semester

L	T	P	C
3	0	0	3

CYBER TOOLS & TECHNIQUES

Course Objectives: The students will be able to understand various tools and techniques used.

Course Outcomes: After studying this course the students will know-

1. Digital Data Acquisition & Examination
2. Tools used in detection of Alteration in Biometrics
3. Tools & Techniques used in Biometric Authentication.
4. Image Manipulation & Video Alteration detection tools.
5. Cyber Crimes & Social Media Data Analysis.
6. Laws pertaining to the admissibility of Electronic Evidence.

UNIT-I: Computer Artifacts

Definition, Cardinal Rules, Introduction to Digital forensics, Handling Forensic software and hardware – TX1, TD2u, Data Acquisition, Imaging: types of formats and authentication: Tools & processes, Windows Systems-FAT12, FAT16, FAT32 and NTFS, UNIX file Systems, MAC file systems, Computer Artifacts, Internet Artifacts, OS Artifacts and their forensic applications, Memory hierarchy, Types of memory, Storage devices, System software.

UNIT-II: Fundamentals of Biometrics

Introduction – Benefits of biometric security, Verification and identification, Basic working of biometric matching, Accuracy – False match rate, False non-match rate, Failure to enroll rate, Derived metrics – Layered biometric solutions. Fundamentals of Gait Analysis, Motion Analysis Systems & theirdetection tools, Competing voice Scan (facial) technologies – Strength and weakness, Facial Character Recognition systems and their development tools.

UNIT-III: Data Recovery

Introduction, Phases of Digital Forensics, Tools used for Imaging – FTK, cmd values. Introduction to Write-Blockers-– Hardware & Software, Types of Data Extraction Tools – Hardware & Software, Comparative analysis of data & metadata, Analysis of Image metadata, EXIF metadata & different video codec forms with tools used for detection of altering.

UNIT-IV: In-Depth Forensic Analysis

Forensic Analysis of OS Artifacts, Internet Artifacts, File System Artifacts, Registry Artifacts, Application Artifacts, Usage of Slack space, Report Writing, Mobile Forensic- Identification, Collection and Preservation of mobile evidence, multimedia evidence, social media analysis, Data retrieval, E-mail investigation, tracking and analysis from mobile phones, IP tracking, renamed file, ghosting, compressed files.

UNIT-V: Forensic Tools & Techniques

Introduction to Forensic Tools - Encase, FTK, Photorec, Sleuth kits, Autopsy, Magnet Axiom & Examine, Oxygen Forensics, Cellebrite UFED4PC, MSAB-XRY, Metasploit, SQL Injection, SQ-lite, Bulk Extractor, Elocmsoft, Praat, Pro-Discover, Disk-Digger, Disk-driller, Recuva, Nessus, Nikto, Nmap, Zenmap, Burpsuit, Kali- Linux, cedarpelta, CDIIR tool, Penorma, Wingman, RAM analysis tools, Vulnerability Assessment Tools.

SUGGESTED READINGS

1. Digital Forensics with Open Source Tools by C. Altheide& H. Carvey.
2. Biometrics – Identity Verification in a Networked World by Samir Nanavati, Michael Thieme, Raj Nanavati.
3. Biometrics for Network Security by Paul Reid
4. Dreamtech Biometrics- The Ul by John D. Woodward, Jr. Wiley.
5. Security in Computing by Charles P. Fleeger.
6. Lab Mobile Forensics by Rohit Tamma.
7. CYBER LAW-The Indian Perspective by Pawan Duggal.
8. 7 Years of Indian Cyber Laws by Rohas Nagpal.
9. Doctrine of IT Act of India, Government of India Publication (2000)

CO-CURRICULAR ACTIVITIES

1. Visit cyber cell.
2. Visit IT organization

IV Semester

L	T	P	C
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CYBER TOOLS & TECHNIQUES LAB

List of Experiments

1. Extracting the data from the digital device using Celebrite UFED.
2. Extracting the data from hard disk using Encase software.
3. Performing logical extraction in the given device.
4. Performing physical extraction using appropriate tool.
5. Network Scanning using Nmap & Zenmap
6. Network analysis using Wireshark
7. Creating a cellphone dump/data extraction with - MSAB-XRY / Oxygen Forensics / CellebriteUFED4PC
8. Creating Image file with hash values using FTK.
9. Image metadata & EXIF metadata Analysis
10. RAM Acquisition & Analysis

IV Semester

L	T	P	C
3	0	0	3

DIGITAL FORENSICS

Course Objectives: The students will be able to understand the importance of digital forensics.

Course Outcomes: On successful completion of the course the student will be able to:

1. Understand the role of investigator and lab requirements in Digital Forensics.
2. Understand Data Acquisition methods, tools and storage formats of digital evidence.
3. Collect, Preserve and Seize various digital evidences.
4. Validate and test evidences using various methods.

UNIT- I: Computer Forensics and Investigations

Computer Forensics: Introduction, Investigation Process, Systematic Approach. Data Recovery Workstations and Software, Investigator's Office and Laboratory: Forensics Lab Certification Requirements, Physical Requirements for a Computer Forensics Lab, Basic Forensic Workstation.

UNIT- II: Data Acquisition

Storage Formats for Digital Evidence, Acquisition Methods, Contingency Planning for Image Acquisitions, Validating Data Acquisition, RAID Data Acquisition, Acquisition Tools, Remote Network Acquisition Tools.

UNIT-III: Identifying, Processing Crime and Incident Scenes

Digital Evidence: Search, Collection, Preparation, Isolation, Storage, Process, Verification, Documentation, Report, Archiving.

Computer Forensics Tools: Evaluating Needs, Hardware & Software Tools.

UNIT- IV: Validating and Testing Forensics

Forensic Analysis of Software and Validation: Data Analysis, Hiding techniques, Carving, Compression; Graphics file: Recognition, Location, Recovery, Live Memory Forensics (RAM)

UNIT- V: Introduction to Email Investigation

E-mail Investigations, Role of E- mail in Investigations, Role of Client and Server in E-mail, E- mail Crimes and Violations, E-mail Servers, Special E-mail Forensics Tools.

SUGGESTED READINGS

1. Guide to computer forensics and investigation 3rd or 4th edition by Amelia Philips, Bill Nelson and Christopher Steuart.
2. https://www.intaforensics.com/2012/01/20/understanding-the-computer-forensics- process/
3. https://www.coursehero.com/file/p3ip151/Understanding-Data-Recovery- Workstations-and-Software-Investigations-are/
4. study.com/academy/lesson/raid-acquisitions-in-digital-forensics-definition-process.html
5. https://prezi.com/ebwye4gtrmyj/chapter-9-computer-forensics-analysis-validation/
6. https://www.thebalancesmb.com/copyright-definition-2948254
7. https://www.ques10.com/p/24610/explain-a-standard-procedure-for-network-forensics/?
8. https://www.makeuseof.com/tag/technology-explained-how-does-an-email-server-work/

SUGGESTED CO-CURRICULAR ACTIVITIES

1. Visit to Cyber Cell.

2. Visit to Cyber Crime Scene.

IV Semester

L	T	P	C
0	0	2	1

DIGITAL FORENSICS LAB

List of experiments:

1. Disk Imaging (2 types)
2. FTK Imager
3. Cyber check suite and other forensic tools from CDAC
4. Forensic Imaging of Virtual Machines
5. Live Acquisition
6. Live Incident Response
7. Live Memory Forensics (Volatility framework)
8. Scalpel, Autopsy
9. Network Minor
10. Comparison of various softwares.

V Semester

L	T	P	C
3	0	0	3

MOBILE FORENSICS

Course Objectives: The students will be able to understand the importance of mobile forensics.

Course Outcomes: After studying this course the students will know-

1. Basics and important terminology of the mobile devices.
2. Different types of acquisition methods on various platforms.
3. Internal working structure of the various mobile platforms.
4. Data recovery techniques and Data extraction techniques on various mobile platforms.
5. Different forensic tools that are used for various mobile platforms.

UNIT- I: Mobile Forensics – I

Mobile Phone: Basics**,** Components, Associated Crimes, SIM Card, SIM Security, Mobile forensics: Challenges, Evidence Extraction process- phase wise.

UNIT- II: Mobile Forensics – II

Potential evidence stored on mobile phones, Rules of evidence (Admissible, Authentic, Complete, Reliable, and Believable). Good forensic practices- Securing, Preserving, Documenting the evidence. Windows OS based mobile Phone Forensics- Windows Phone OS, Data acquisition. BlackBerry Forensics- Data acquisition.

UNIT-III: Android Forensics - I

The Android models- The Linux kernel layer, Libraries, Dalvik virtual machine, the application framework layer, the applications layer, Android security - Secure kernel, the permission models, Application sandbox, Secure inter process communication, Application signing. Android file hierarchy, Android file system- Viewing and analysis.

UNIT-IV: Android Forensics–II

Android Forensic Setup and Pre-Data Extraction Techniques, Screen lock by passing techniques, Gaining root access, Android Data Extraction Techniques - Imaging an Android Phone. Data recovery Techniques, Android App Analysis and Overview of Forensic Tools- Android app analysis, Reverse engineering Android apps, Forensic tools overview, Cellebrite – UFED, MOBILedit and Autopsy.

UNIT-V: iOS Forensics

Internals of iOS Devices, iPhone models, iPhone hardware, iPad models, File system, The HFS Plus file system, Disk Layout, iPhone operating system, Data Acquisition via a custom ram disk, Acquisition via jail breaking, Data Acquisition from iOS backups, iTunes backup, iCloud backup.

SUGGESTED READINGS

1. Practical Mobile Forensic by Satish Bommisetty, Rohit Tamma and HeatherMahali kunder
2. https://www.electronics-
3. notes.com/articles/connectivity/cellular-mobile- phone/how- cellphone-works-inside-components.php
4. https://pavanduggalonmobilelaw.wordpress.com/kinds-of-mobile-crimes/
5. https://resources.infosecinstitute.com/windows-phone-digital-forensics/
6. https://www.gillware.com/phone-data-recovery-services/windows- phone-forensics/
7. https://link.springer.com/chapter/10.1007/978-3-642-39891-9_15
8. https://www.nist.gov/system/files/documents/forensics/5-Punja-nist- 2014-bb-forensics- FULL.pdf

SUGGESTED CO-CURRICULAR ACTIVITIES

1. Visit to cyber cell regarding mobile phones as evidence.
2. Visit to cybercrime scene.

V Semester

L	T	P	C
0	0	2	1

MOBILE FORENSICS LAB

List of Experiments:

1. Installation of Android Studio
2. Working on Open-source android forensic tool kit (OSAF-TK)
3. Santoku Linux
4. Andriller and other tools
5. Extraction of mobile data using Oxygen forensic suit
6. Physical Extraction of Data from mobile device using UFED Touch
7. Analyzing data of android mobile using MOBILedit
8. Analyzing android device using autopsy forensic tool.
9. Comparison of software -Mobiledit & Autopsy.
10. Comparison of open-source software and closed source software.

V Semester

L	T	P	C
3	0	0	3

MULTIMEDIA FORENSICS & SPEAKER IDENTIFICATION

Course Objectives: The students will learn about multimedia and can identify the speaker.

Course Outcomes: After studying this course the students will know-

1. Overview of Multimedia Forensics
2. Image Enhancement Techniques
3. Video Frame Analysis
4. DVR Examination
5. Voice Production Process
6. Automatic Speaker Identification System

UNIT-I: Fundamentals of Multimedia

Multimedia: Introduction, Definition, History, Need, Development Platforms (MS DOS, Windows, Linux), Elements (Text, Graphics, Bitmap Images, Vector Graphics, Audio, Video, Animation), Hardware/ Software Requirements.

UNIT-II: Multimedia Forensics

Multimedia Forensics: Introduction, Scope, History, Standards, Practice; Multimedia Authentication: Active Image Authentication, Passive Image Authentication, Video Authentication, Audio Authentication; Basics of Multimedia Devices for capturing image, video and audio; Forensic Analysis: Audio Evidences, Image Evidences, Video Evidences, CCTV Footages; Statistical Interpretation of Forensic Analysis; Legal Admissibility of multimedia evidence. Metadata analysis of Audio / Video/image file, evidence handling, Case studies.

UNIT-III: Image and Video Forensics

Image/ Video Forensics: Introduction, Scope, Standards, Active and Passive Forensics, Blind and Non-Blind Forensics; Methods: Source Camera Identification and Tampering; Enhancement of digital image/video, Specific Frame Analysis, Forensic Applications; DVR Examination.

UNIT-IV: Audio Forensics

Sound: Attributes (Tone, Intensity, Frequency, Wavelength, Pitch), Channels (One- Mic, Stage,

Location, Video Mic), Effects (Amplitude, Delay, Time/pitch, Reverse, Invert), Types (Analog/Digital), Digitization (Sampling, Quantization, Encoding), Formats (Uncompressed, Lossy Compressed, Lossless), Acoustic Parameters, Fourier Analysis, Frequency and Time Domain Representation of Speech Signal, Fast Fourier Transform;

Digital Audio: Methods of tampering, Forensic authentication, Enhancement; Microphone Forensics, Software; Forensic Audio Analysis.

UNIT-V: Speaker Identification

Speaker identification: Introduction, Need, Scope, Human Vocal Tract, Production & Description of Speech Sound, Speech Signal Processing and Pattern Recognition;

Forensic phonetics and phonetic transcription, Methods of speaker identification: auditory and spectrographic analysis, Spectrographic cues for Vowels and Consonants, Automatic Speaker Identification System, Collection of voice samples: methods and challenges.

SUGGESTED READINGS

1. Handbook of Digital Forensics of Multimedia Data and Devices by Anthony T S Ho, ShujunLi
2. Multimedia Forensics and Security Foundations, Innovations, and Applications by AboulElla Hassanien, Mohamed Mostafa Fouad
3. Fundamentals of Speaker Recognition by Homayoon Beigi
4. Fundamentals of Speaker Recognition Law Enforcement and Counter- Terrorism by AmyNeistein, Hemant A. Patil
5. Forensic Comparison of Voice, Speech and Speakers by Jonas Lindh

SUGGESTED CO-CURRICULAR ACTIVITIES

1. Visit cyber cell
2. Preparation of model on voice structure.

V Semester

L	T	P	C
0	0	2	1

MULTIMEDIA FORENSICS & SPEAKER IDENTIFICATION LAB

List of Experiments:

1. Collection of multimedia samples
2. Physical examination of Audio recording media
3. Examination of questioned recorder
4. Photo microscopic examination in case of analogue exhibits / speech signals.
5. Comparisons of audio recordings in terms of their contents.
6. Physical examination of Camcorder/VCR/Mobile phones.
7. Segregation of voice using Audacity.
8. Image analysis.
9. Analysis of voice.
10. Comparison of Praat software and Audacity Software.